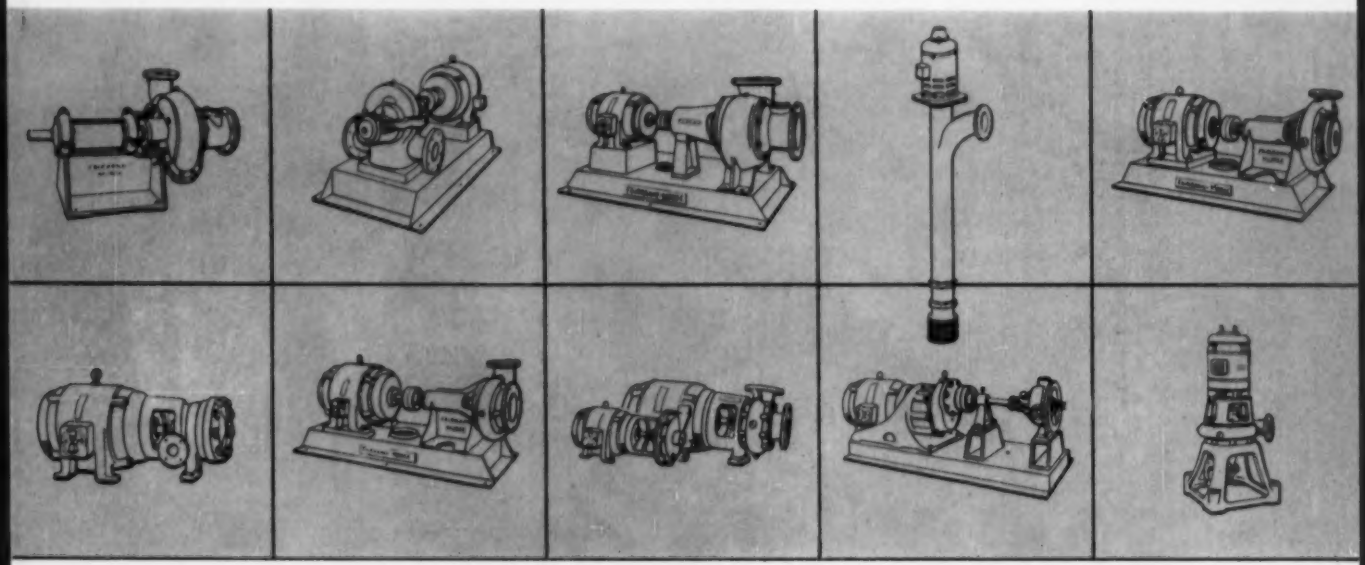
the iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY · APRIL 14, 1955

Will business boom continue through 1955 and 1956?
See page 51



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LONGFELLOW'S
VILLAGE BLACKSMITH

Dear to the heart of every small town boy was the shop memorialized in Longfellow's Village Blacksmith, pictured here from an old woodcut. As late as fifty years ago, the smithy was the focal point of rural America's metalworking industry.

Crafts and craftsmen through the ages

NUMBER THREE OF A SERIES

Basic believes in the old tradition of complete service—selecting raw materials with care, producing dependable refractories and then making sure they're used to best advantage.

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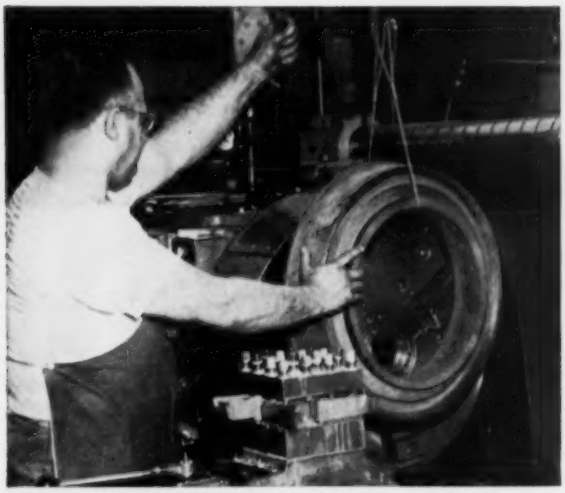
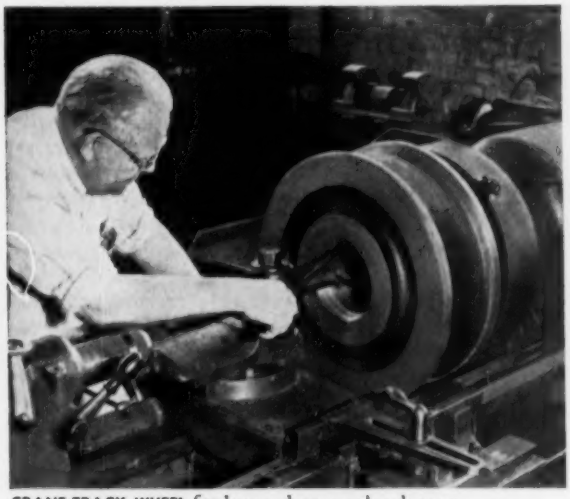


COMMUTATOR FORGING being positioned for machining.

SPUR GEAR for use in diesel locomotive service.



CRANE-TRACK WHEEL for heavy-duty overhead crane.

SHEAVE WHEEL—one of 43 in large floating crane.

So Many Different Uses for These Forged-and-Rolled Blanks

If you require circular steel blanks in the making of your products, Bethlehem has much to offer you, both in quality and variety. We manufacture forged-and-rolled blanks for a seemingly endless number of uses, and each year the list grows bigger.

Here are a few of the products being made today from these circular forgings: spur, bevel, and herringbone gears; double-flange crane-track wheels; industrial wheels of many kinds; turbine rotors and bucket wheels; clutch drums, brake drums; sheave wheels, flywheels; tire molds and mold rings. There are many additional applications, of course, some of them highly specialized.

Often the first problem in designing such products is to achieve high strength with a minimum of weight. Bethlehem's manufacturing process supplies an answer to this common problem. The blanks are processed in a unique mill that combines the steps of forging and rolling, so that the blanks have the density of forged metal plus the smooth grain flow of a rolled product. The end result is strength—strength so high that users often find it possible to employ thinner, lighter sections than they formerly specified.

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Bethlehem forged-and-rolled blanks are available in many different types, and in sizes from 10 to 42 in. OD. They can be furnished untreated or heat-treated, whichever you prefer. Write, phone, or wire our nearest office for complete information.

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BETHLEHEM STEEL

BETHLEHEM STEEL

the Iron Age

DIGEST OF THE WEEK

Vol. 175, No. 15, April 14, 1955

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NEWS DEVELOPMENTS

SEE ECONOMY HOLDING STRONG INTO 1956—P. 51
Iron Age Editor Tom Campbell points to confidence and optimism as factors that will keep industry perking through 1956. Metalworking will share in the gains of an expanding economy. Defense spending must continue. Higher wages and prices are due. Smart businessmen will build inventories and increase sales effort to keep in step.

UNIONS WANT SHORTER WORKWEEK NEXT—P. 54
Industry can look for the auto and steel unions to push for a shorter workweek after the guaranteed wage battle ends. Labor spokesmen point to technical advances and increases in the labor force as conditions calling for less working hours. Move would boost costs about 20 pct.

TIGHT NICKEL SUPPLY WORRIES STEELMAKERS—P. 56
The next 3 to 6 months may be tough going for civilian consumers of nickel and nickel-bearing alloys. Stockpile requirements plus defense and private needs add up to a supply pinch of serious proportions. Makers of stainless and alloy steels are among those facing the problem of shrinking stocks as output runs far ahead of receipts.

BRIQUETTES ARE GOING INTO OPENHEARTHS—P. 57
Pittsburgh scrap dealers are installing briquetting machines with openhearth furnace as the target. High density gives briquettes a big advantage. But lack of analysis of turnings is a handicap. Pittsburgh Steel is a user. Foundries are big consumers.

AUTO STYLISTS DREAM OF 1959 MODELS — P. 68
Lead time for a model change is about 3 years. But long before that, engineers and stylists are working on future improvements. Customer research is a constant undertaking. Model changes run into the hundreds of millions of dollars.

MERGER TREND MAY BE LEVELLING OFF — P. 73
Justice Dept. reports no increase but warns that they involve larger economic concentrations. Congressional committees, seeing public interest, are scheduling a series of merger probes. Functions of committees and agencies appear to overlap. Situation may cause conflicts.

IN METALWORKING

ENGINEERING & PRODUCTION

WELDING: PROBLEMS OUTLINE FUTURE PATH — P. 91
Welding's future will be closely tied in with four major fields: nuclear energy, electronics, automation and human engineering. It will be important in the first three and benefit from the fourth. Management's job will be to train welded design engineers.

MATERIALS SPARK WESTERN METAL SHOW — P. 95
New developments in die materials, titanium, high strength steels and nondestructive testing were among the many important topics discussed at the Ninth Western Metal Congress and Exposition. Aircraft, petroleum, electronics and powder metallurgy industries all received attention of speakers and exhibitors.

IDEAS BOOST SCREW MACHINE OUTPUT — P. 98
A simple switch to a dual tooling setup on multiple spindle automatics boosted bearing race output at this shop by 60 pct. Machines were slowed only slightly, now make two races per cycle instead of one. Better materials handling helps production, too.

MODULAR UNITS AID VACUUM MELTING — P. 100
Modular type vacuum furnace equipment can simplify the transition from pilot plant to full-scale production of vacuum melted metals. Small batch-type equipment could be outmoded easily. But future production is assured by designing laboratory units which can be expanded. Modular design will help those firms that must pay close attention to costs.

RATE HEAT RESISTING ALLOY STEELS — P. 103
Chromium alloy steels are advantageous in many applications involving high-temperature service in modern aircraft. Two alloys, Halcomb 218 and Chro-Mow present an unusual combination of strength and ductility at temperatures as high as 1100°F. At 300°-1100°F these alloys offer superior strength-density ratios.

MARKETS & PRICES

MORE STEEL CAPACITY NEEDED IN WEST — P. 77
Diversified steel production on the Coast is needed to stimulate new industries. If steel was there western manufacturers would fabricate many items now "imported" from other areas.

HAPPY DAYS ARE HERE FOR MACHINE TOOLS—P. 79
Machine tool new orders have been coming in at the rate of over $60 million a month since December. March figures aren't in yet but private reports point to another fine showing. Vacation time will probably mean a lag but builders feel the early year pace has put the industry in healthy condition. They call for renewed sales effort.

STEEL PRODUCTION RECORDS ARE FALLING — P. 147
In their efforts to keep pace with demand, steel producers are setting production records on rolling mills. But they are still finding it hard to maintain delivery promises. Some producers are turning down third quarter business until they see where they stand. Export market for semi-finished continues hot but foreign consumers are having trouble getting on mill schedules. Scrap exports are a problem.

MIDWEST AUTO, FARM DEMAND AT HIGH PACE—P. 148
Sustained midwestern pressure for steel has resulted in extended backlogs and delivery delays. Automotive, agricultural battle is keeping Great Lakes area mills tightest in the nation. Order drive is so intense, some mills in the area may "drop a month"—a situation that hasn't happened since post strike days of '52.

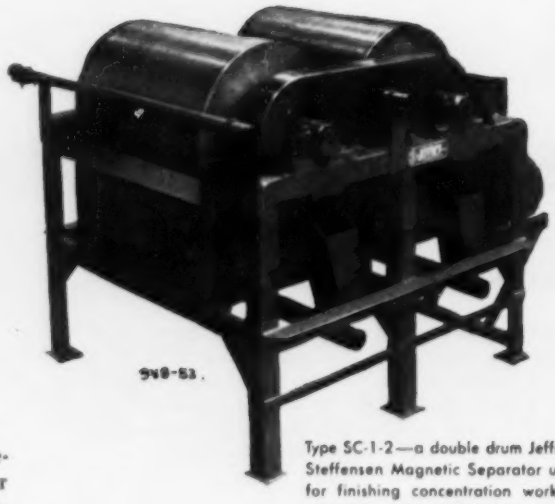
ZINC IS LATEST PRICE PRESSURE VICTIM — P. 154
Increase in zinc prices last week puts this metal in same category as copper, aluminum, magnesium. They've all been subject to price hikes since the first of the year. Indicates inflationary forces are more active in nonferrous field than in other markets.

NEXT WEEK:

METALLURGICAL BLAST CUPOLA OFFERS SAVINGS
Foundrymen and steel men like what they've seen of the metallurgical blast cupola. It combines the operating characteristics of the blast furnace with the low pressure blast and continuous tapping features of the conventional cupola. It will work on a 100 pct scrap steel charge, make foundry iron without loss.

WHAT'S BEHIND THE ALUMINUM SHORTAGE?
Iron Age editors probe behind the scenes for answers to current aluminum shortage. Will limitations on exports be enough to alleviate the situation? What's in the future? Is the shortage in primary aluminum or in finished products? What about the stockpile? Is it much of a factor in the situation?

for highest recovery at lowest cost... JEFFREY MAGNETIC SEPARATORS



Type SC-1-2—a double drum Jeffrey-Steffensen Magnetic Separator used for finishing concentration work in magnetite and taconite plants.

Twenty years of concentrated research and improvement, following the development of a Steffensen counter flow magnetic separator, have given Jeffrey world leadership in the drum-type wet magnetic separator field. Jeffrey units are rapidly replacing other types in all industries where more efficient magnetic separation is required.

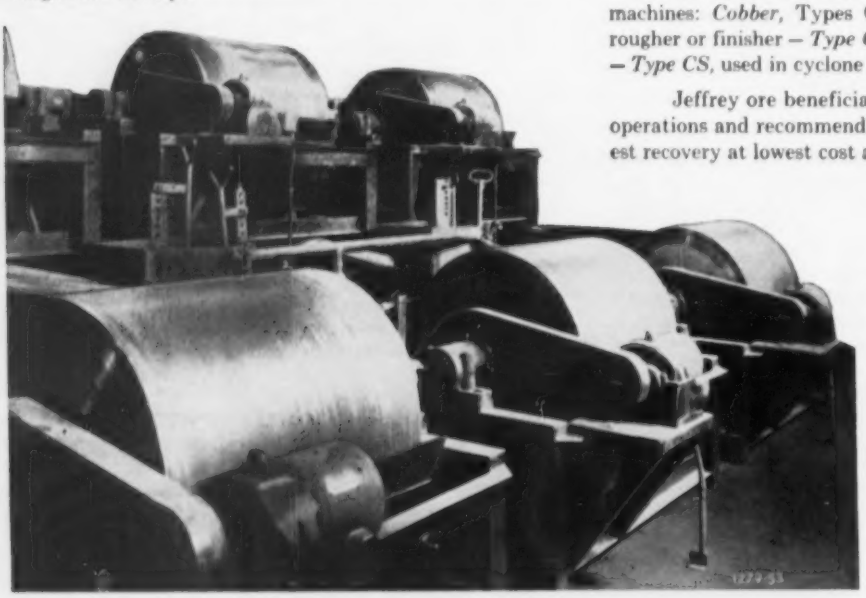
These units pay big dividends in concentrating magnetic taconite and magnetite, and in recovering ferrosilicon and magnetite media used to concentrate other minerals.

Simplicity of design and construction cuts maintenance to a minimum, yet this simplicity gives maximum magnetic recovery.

A typical Jeffrey magnetic separation improvement is the new-type coil. During recent laboratory tests this coil was submerged 120 hours in water dosed with all the chemicals found in hardest water used at mining operations. Under direct current power, the coil gave no evidence of grounding.

Jeffrey manufactures four basic magnetic separation machines: *Cobber,* Types C and S – *Steffensen,* used as rougher or finisher – *Type CO,* used in heavy media plants – *Type CS,* used in cyclone process heavy media plants.

Jeffrey ore beneficiation engineers will study your operations and recommend the ideal installation for highest recovery at lowest cost at your plant.



This battery of six Type CO-1 Jeffrey Magnetic Separators has been recovering ferro-silicon at a Minnesota iron ore heavy media plant for more than two years.

WRITE FOR TECHNICAL DATA

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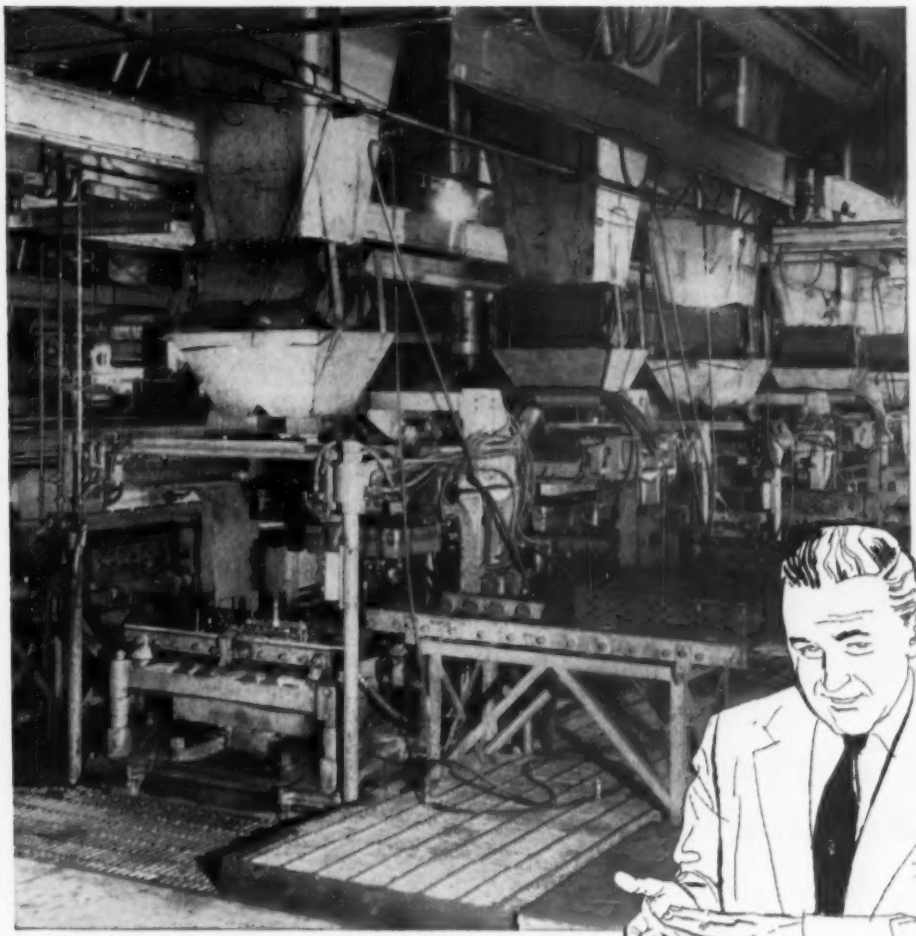

Whether you make or buy castings, here is how to lower costs...now

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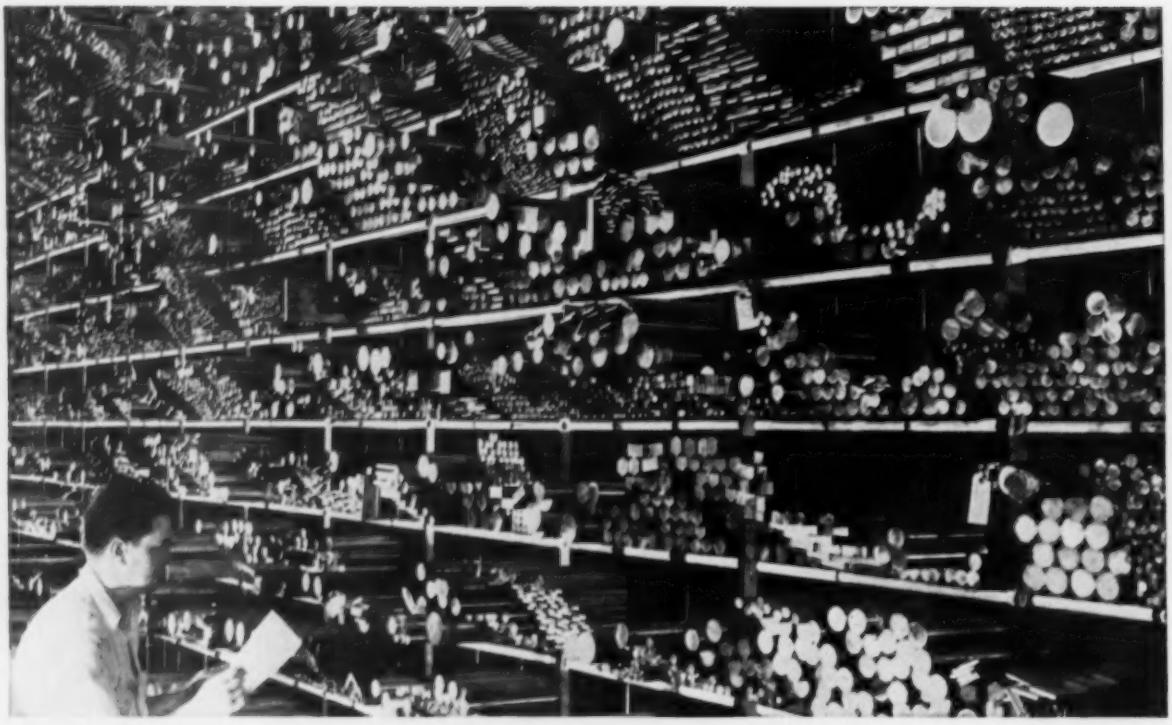

Here's a STAINLESS "DEPOSIT" that You Can Draw on

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Editorial:

Short Hair Economics

◆ EVERYONE KNOWS that more people mean more houses, more machine tools, more steel, more aluminum, more gadgets, and more fun. There seems to be a long-hair hassle these days involving family formations, housing starts, and credit.

The argument runs somewhat as follows: There are 600,000 family formations per year and close to 1.4 million housing starts. The glooms have it that this means an inflated housing market. They also predict a bust is coming in the home building field.

It isn't going to work this way at all. Family formations are relatively low because of the low birth rate during the Great Depression. This depression in the number of family formations will end by 1960. And from then on, new family beginnings will skyrocket. They will make current figures look puny by comparison.

But we don't have to wait for 1960 to find support for the housing starts which are climbing again this year. The long-hairs would have us believe that the no down-payment and 30 years to pay plans are the main factors in the home building boom. That's not so. Already one major governmental department is no longer taking family formations as the only major factor in estimating our future growth.

There are literally hundreds of thousands of families which are upgrading their living quarters by buying new homes. They are doing this because they are making more money; because they think they are entitled to a better place to live in, or because they are tired of living with relatives.

This takes care of an uncalculated number of new homes being built. It also accounts for the unending purchases of appliances, television sets, plumbing, furniture, heating units, fans, and air conditioners. And everything that stirs up the consuming industries creates a terrific impact on the heavy industries.

Another assist in the home building picture is the annual crop of babies. Each crop has increased every year since 1940. The 1955 total will be about 55 pct greater than the number born in 1940. Simply put: in the long run, it is cheaper to buy a new home than to tack a couple new rooms onto an old house. That's one of the reasons why home construction is not going to slow up for some time.

Short hair economics indicate bigger family formations will soon be operating along with the baby boom. Then you had better be prepared!

Tom Campbell

EDITOR

NO. 1 OF A SERIES
ON THE HISTORY OF ABRASIVES
BY CHICAGO WHEEL & MFG. CO.

ABRASIVES ARE AS OLD AS MAN... YET AS NEW AS TOMORROW'S NEWSPAPER!

The earliest traces of mankind indicate no knowledge of abrasion. But, somewhere in the prehistoric ages man learned of the power of grinding down one stone with another. Thus was born one of the world's greatest mechanical aids, the forerunner of today's abrasive industry.

MOTHER NATURE was the first abrader. The glaciers of the ice age, their undersides studded with rocks of all sizes which were held in the ice with considerable firmness, acted as a gigantic grinder in passing over the earth. They abraded, grooved, and polished the rock and terrain. Actually, the glaciers could be likened to the modern grinding wheel, with the imbedded rocks representing the grain and the ice forming the bonding material.

DID MAN learn of abrasives from observing the action of glaciers? Probably not. Scientists tell us that man first knew nothing of the mechanics of abrasion, depending on breaking and chipping rock to form his crude tools and weapons.

FIRST REALIZATION that objects could be worn down by abrasion is supposed to have occurred when aborigines were grinding grain on the simplest form of grain mill. A man (or woman) noticed how the top stone, usually a round smooth one, eventually wore a groove in the larger flat stone.

ACTION of the stones wearing on each other suggested the use of abrading to help shape and form weapons and tools. Archaeologists have found spearheads and other implements that evidence the smoothing action obtained by rubbing stone on stone.

The polishing job that took prehistoric man weeks of toil now could be done in seconds with a modern grinding wheel. Engineering and manufacturing abrasive wheels to parallel man's desire for improvement has been the job of Chicago Wheel for over 65 years.

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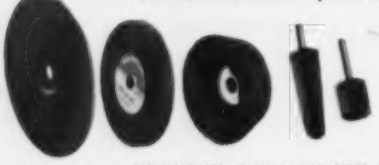

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dear editor: *letters from readers*

Who Are These People?

Sir:

Your editorial entitled "Who Are These People?" is indicative of your understanding of the Communist menace, and I certainly agree that we should be prepared both physically and spiritually to combat this evil force. *J. Edgar Hoover, Director, Federal Bureau of Investigation, U. S. Dept. of Justice, Washington, D. C.*

Librarian's Lament

Sir:

I find the "Letters from Readers" very, very dull. Who besides the inquirer cares that the Doakes Co. asked for and promptly received reprints of the recent article on Compur shutters for nefer trunnions? Everyone knows that IRON AGE's service and courtesy are such that they'll promptly get whatever they ask for, short perhaps of the doorknob off the 42nd St. entrance.

Also, how about asking the boys in the composing room to shove the issue number about an inch higher up the spine of each issue? When it reaches me, the bottom back corner is always frayed just enough to make the issue number unreadable—and as a librarian I need it in my business.

Also, so the magazine can be bound more easily, try to persuade advertisers to accept space such that more text can be put on a leaf —both sides of each alternate leaf, maybe, instead of one column per leaf, in the back of the book. Costs us $12 or $14 a year to bind the magazine. Or is microfilm available? *D. A. Redmond, Librarian, Nova Scotia Technical College, Halifax, Nova Scotia.*

Nothing like a good plain letter. Most people in business and industry don't write letters to the editor for fear of getting involved in company policy, trouble with suppliers, customers, etc. So business papers never get the percentage of controversial letters which consumer magazines receive.

We have now moved the volume number up on the spine to take care of you and your fellow librarians.

Microfilm is available through University Microfilm, 313 North First St., Ann Arbor, Mich.—Ed.

Plastic Steel

Sir:

We are very much interested in the plastic and steel powder as explained in your article on pp. 98-99 of the Feb. 17 issue of THE IRON AGE.

The article mentions "Devcon Plastic Steel" but we have been unable to locate any company by that name. We would appreciate any information you can give us in regard to the availability of this powder so that we may secure samples and literature for further study. *T. D. Maloney, Purchasing Agent, Trifari, Krussman & Fishel, Inc., Providence, R. I.*

Devcon Plastic Steel is made by the Quint-Alloy Corp., 24141 Ann Arbor Trail, Dearborn, Mich.—Ed.

Bearing Metal

Sir:

In the Newsfront of your Feb. 17 issue, brief notice is made of a copper-lead bearing metal of exceptional qualities.

Will you please inform us of the source of this news item and how and where we could procure additional and more detailed information on this bearing metal? *R. P. Steijn, Mechanical Research Section, Mechanical Development Laboratory, E. I. du Pont de Nemours & Co., Wilmington, Del.*

Detailed information may be obtained from The Iso Mite Corp., 4470 E. Washington Blvd., Los Angeles 23, Calif—Ed.

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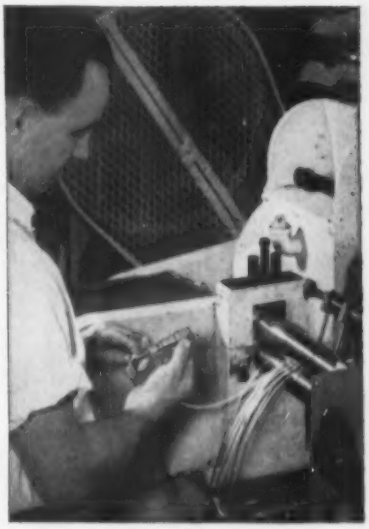
THIN STRIP

for exacting standards only



Not one strip rolling requirement in ten need be carefully "miked" to assure close width tolerance.

But that exceptional job is routine with Somers THIN STRIP. Monel, pure Nickel and Nickel alloys are rolled to within ±5% from .010" to .00075", with the same degree of accuracy in widths, and with the exact properties required by your product.

Modern rolling, annealing and precision control equipment assure uniform high quality under the most rigid specifications.

And Somers 40 years experience in a wide range of applications is available to help solve your strip problem without obligation.

Write for confidential data blank or field engineer.

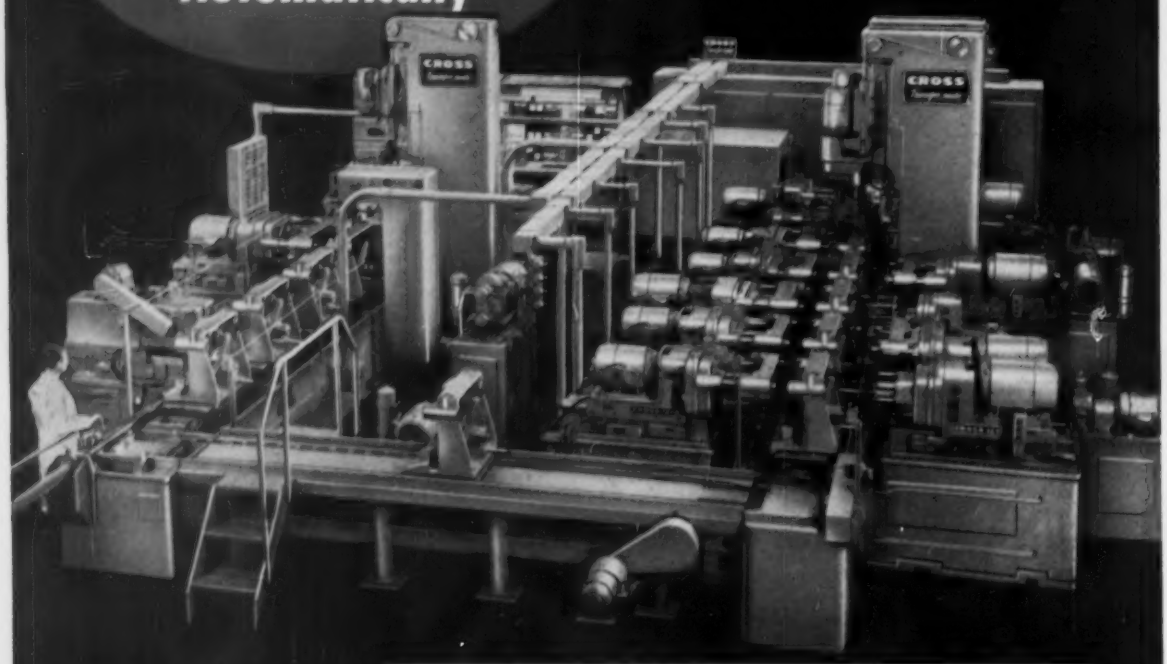
FOR EXACTING STANDARDS ONLY

Somers

Somers Brass Company, Inc.,
WATERBURY, CONN.

Another Transfer-matic by Cross

Machines Flywheel Housings and Changes Set Up Automatically



- ★ Completely machines (except for grinding three faces) flywheel housings for both standard and automatic transmissions.
- ★ Flexibility for scheduling because either part may be produced as required—set up changes and proper tools are selected automatically at each station.
- ★ 170 pieces at 100% efficiency.
- ★ 49 drilling, 22 chamfering, 4 reaming, 2 counterboring, 2 boring, 30 inspecting, and 30 tapping operations.
- ★ Palletized work holding fixtures with automatic transfer from station to station.
- ★ Hydraulic power wrench for clamping parts.
- ★ Other features: Complete interchangeability of all standard and special parts for easy maintenance; construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; automatic lubrication.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

fatigue cracks

by William M. Coffey

The Fifth Estate

You may as well know it. THE IRON AGE is moving from New York to Philadelphia to take up air-conditioned quarters with the Chilton Co., our parent company and GHQ. This move will take place early in the summer, but already the only talk around here is "bought your new house yet?", "sell your old one yet?" We're fast becoming experts on mortgages, taxes, and markets.

The big argument is whether it's best to sell your house by yourself or call upon the services of a real estate man. At the moment we tend towards the sell-it-yourself notion and are busily at work putting the old homestead in shape to grace the market. We have already added a den, a fourth bedroom, a playroom or recreation room whichever you prefer. We did this merely by putting a picture window where the door used to be in the old attached garage (we built a new unattached one last summer, *big selling pt).* We now defy anybody to call this a garage. From now on its a *rec rm unf* as we will say in the ads or a recreation room unfinished. You must come out and see our *rec rm unf* sometime. No heat, no walls or floor, but a beautiful *rec rm unf.*

We have also contracted with a nursery to plant dozens and dozens of flowers and bushes in full bloom —on a rental basis. They're to be buried in flower pots and later returned to the nursery. Now we can say *beaut landspe flowering acre, Conn.* Little touches count, too. All doorknobs have been shined. Front door painted. Birdhouse painted. Throw rug bought for crack in hall floor. We have disowned the children. Nobody is going to know we've had three little vandals running loose around the house. From now on they are the neighbors' children if they show up when a client shows up. "Dickie Symthe-Symthe, you know you are never allowed in this house. Go home at once, and remove your shoes before stepping on the lawn."

An architect friend has drawn up "expansion" plans. These are the plans which will enable us to say, "This was the summer we planned to do all these things—the *rec rm unf,* the additional bathroom and bedroom, the patio, the swimming pool, the kennels, the yacht basin. Tell you what, you go ahead with these plans and we'll knock off $249.98 so you can do it right."

Anyone have any other ideas? We're starting at $77,700 (seventy-seven-seven), but will come down as *"exec must move immedt."*

Puzzlers

Everyone of our 25 loyal readers solved the Mar. 10 puzzler which involved moving the number 3 from the last end of a number to the t'other and getting a number equal to three times the original number.

The answer is 1,034,482,758,620,-689,655,172,413,793. Winners: Ray Robinson, Turvis Williamson, N. L. Stear, C. R. Dobson, Rosco, A. H. Phelps, F. S. Tyler, Water M. Cree, G. J. Campbell, C. W. McKinley, R. H. Stitt, Lawrence J. Hegman, ole Abe Raich, W. K. Crownfield, Dick Hautzenroeder, W. J. Petti, Don Wharton, Robert K. Orndoff, H. C. Husser, Cecil Delano, William E. Hawkins, Tom Stitt, C. F. Smart and Paul A. Tackett.

New Puzzler

Do you know about the three cannibals and three missionaries who reached the river and in order to cross had one two-man boat which any of the missionaries could row? However, at no time could they allow the cannibals to outnumber them for the obvious reasons—in the boat or on the shore. One of the cannibals can row, but only one. How did all get to the other side?

Many thanks to our friend Mr. G. J. Campbell of Charles City, Iowa.

unique in design —
rugged in construction

GREEN
PANTOGRAPH
ENGRAVERS

The three-dimensional bench Model 106 cuts costs — engraves, routs, models and profiles, giving you expert results even by unskilled workers.

THE NEW
HEAVY-DUTY
MODEL D-2

The Model D-2 heavy-duty two dimensional Pantograph is a precision machine with a multitude of new features. Open on three sides, it permits complete freedom for engraving, milling, profiling large panels (up to 30" in diameter) or bulk pieces. Single, micrometer adjustment controls vertical depth of cut, automatically adjusting copy table with pantograph. Range of reduction ratios from 2-to-1 to infinity! Vertical range over 10 inches!

For complete information, write to

GREEN
INSTRUMENT COMPANY
365 Putnam Ave. Cambridge, Mass.

Export Agent—Frathom Co.
33 W. 42nd Street, New York 36, N. Y.

The 9' dia. column 3' arm Cincinnati Super Service Radial is working on chassis frame parts and aluminum steering column brackets; ¼" dia. to 1¼" holes drilled and reamed to a .0015" tolerance.

The Upright Drill shown is one of six 28" Super Service Uprights working on heat treated alloy steel frames.

Money-making Cincinnati Bickford machines ... at The Autocar Division, WHITE MOTOR CO. —EXTON, PA.

Photos courtesy the Autocar Division of The White Motor Company, Exton, Pennsylvania.

Speed and easy handling—power and accurate, steady performance were factors in the selection of Cincinnati Bickford Super Service Radial and Upright Drills in this plant. They are quickly adaptable to a variety of operations, including drilling, reaming, tapping and trepanning.

For rapid, accurate, dependable production investigate these cost reducing modern drilling machines.

Write for Bulletin R21C.

80 YEARS OF SERVICE

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

APRIL

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Organization anniversary meeting, Apr. 16, Hoboken, N. J. Society headquarters are at 29 W. 39th St., New York.

PACKAGING MACHINERY MANUFACTURERS INSTITUTE — Semi-annual meeting, Apr. 16-17, Palmer House, Chicago. Institute headquarters are at 342 Madison Ave., New York.

AIME, OPENHEARTH BLAST FURNACE, COKE OVEN & RAW MATERIALS COMMITTEES—Annual meeting, Apr. 17-20, Bellevue - Stratford Hotel, Philadelphia. Institute headquarters are at 29 W. 39th St., New York.

EXPOSITIONS

AMERICAN MANAGEMENT ASSN. — National packaging exposition and conference, Apr. 18-21, International Amphitheatre, Chicago. Association headquarters are at 330 W. 42nd St., New York.

NATIONAL MATERIALS HANDLING EXPOSITION — May 16-20, International Amphitheatre, Chicago. Management: Clapp & Poliak, Inc., 341 Madison Ave., New York.

NATIONAL ASSN. OF PURCHASING AGENTS—Annual convention and Inform-A-Show, May 29-June 1, Waldorf-Astoria Hotel, New York. Association headquarters are at 11 Park Place, New York.

SCIENTIFIC APPARATUS MAKERS ASSN. — Annual meeting, Apr. 17-21, The Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters are at 20 N. Wacker Drive, Chicago.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION—Annual national engineering conference, Apr. 18-19, Muehlebach Hotel, Kansas City. Institute headquarters are at 101 Park Ave., New York.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. — Golden Anniversary meeting, Apr. 18-20, Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee spring meeting, Apr. 18-22, Lord Baltimore and Southern Hotels, Baltimore. Society headquarters are at 29 W. 39th St., New York.

SOCIETY FOR ADVANCEMENT OF MANAGEMENT — AMERICAN SOCIETY OF MECHANICAL ENGINEERS —10th Anniversary methods conference, Apr. 28-29, Hotel Statler, New York. SAM headquarters are at 74 Fifth Ave., New York.

MAY

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS—National Meeting, May 1-4, The Shamrock Hotel, Houston, Texas. Institute headquarters are at 25 W. 45th St., New York.

NATIONAL ASSN. OF CORROSION ENGINEERS — Regional Conference, May 9-11, Hotel Statler, New York. Association headquarters are at 1 Main St., Houston 2, Texas.

NATIONAL FEDERATION OF INDEPENDENT SCRAP YARD DEALERS, INC.—Open Forum and Dinner, May 15, Hotel Waldorf-Astoria, New York. Federation headquarters are at 29 Broadway, New York.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Spring meeting, May 15-18, The Homestead, Hot Springs, Va. Association headquarters are at 412 Fifth St., N. W. Washington, D. C.

METAL WORKING PLANTS NEED CASH TO:

every

Absorb design and pattern expense

business

Invest in jigs and dies

Make up the difference between the cash outlay and the depreciation of modern equipment

needs

Maintain supply parts inventories

operating

Extend credit to customers

Conduct research and planning

capital

our business **is to furnish funds**

whether your requirements are for $25,000, $3,000,000 or more, funds are available to you quickly through Heller commercial financing plans.

Heller advances funds for any required period . . . months or years, on a continuing basis. Management and profits are not affected. Because you use our funds as needed and pay accordingly, Heller plans are economical.

Proof of success of our financing programs is evidenced in the fact that last year Heller advanced over Six Hundred Million Dollars to industrial and commercial firms.

To get acquainted with our services, write for information today. Your inquiry will receive prompt, courteous and confidential treatment. Feel free to write without obligation.

MANUFACTURERS AND DISTRIBUTORS: Write for information on Heller Machinery and Equipment Leasing and Installment Sales Plans.

Walter E. Heller & Company

DEPT. IA, BANKERS BUILDING
105 WEST ADAMS STREET, CHICAGO 90
NEW YORK OFFICE 10 E. 40TH ST.
NEW YORK 16

SAVE TIME IN TRACING,
HYDRA-TRACT

TURNING, FACING

with **Hydra-Trace*** *and your LeBlond lathe!*

Check the job list of most any LeBlond Lathe—Hydra-Trace combination. You'll find it turning complex dies in the morning, step shafts in the afternoon. Yesterday, it was contour facing compressor discs; tomorrow, turning bevel gear blanks. And saving time on every one!

Hydra-Trace can be mounted in place of the compound rest on most any LeBlond Lathe . . . *in minutes.* It swivels to the most favorable angle for proper tool clearance. Its flat template is easily made, conveniently stored. Template holder and all controls are neatly located at front of lathe. And you can remove Hydra-Trace to use your lathe for other work in practically no time at all!

For complete data on Hydra-Trace, ask for Bulletin HT-2C

American Brass saves 91% of a 6-hour job! Turning mandrels shaped like baseball bats (used in drawing seamless tubing) ate up 6 hours of lathe and operator time at The American Brass Co., Waterbury, Conn. With Hydra-Trace installed on their LeBlond 16″ x 78″ HD lathe, it's done in 30 minutes! And the same lathe, with Hydra-Trace removed, is still available for regular turning, facing and chasing!

If variety is important in your lathe operations, you can't do better than Hydra-Trace and a LeBlond lathe. We'll tell you promptly whether Hydra-Trace will fit the LeBlond you have. Or we can recommend *exactly* the right combination for your requirements from scores of lathe sizes and models. See your LeBlond Distributor or write Cincinnati today.

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

*Hydra-Trace (Trade Mark registered U. S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

. . . cut with confidence

Be sure to see LeBlond, Booth 1313

LEBLOND *of Cincinnati*

World's Largest Builder of a Complete Line of Lathes • For More than 68 Years

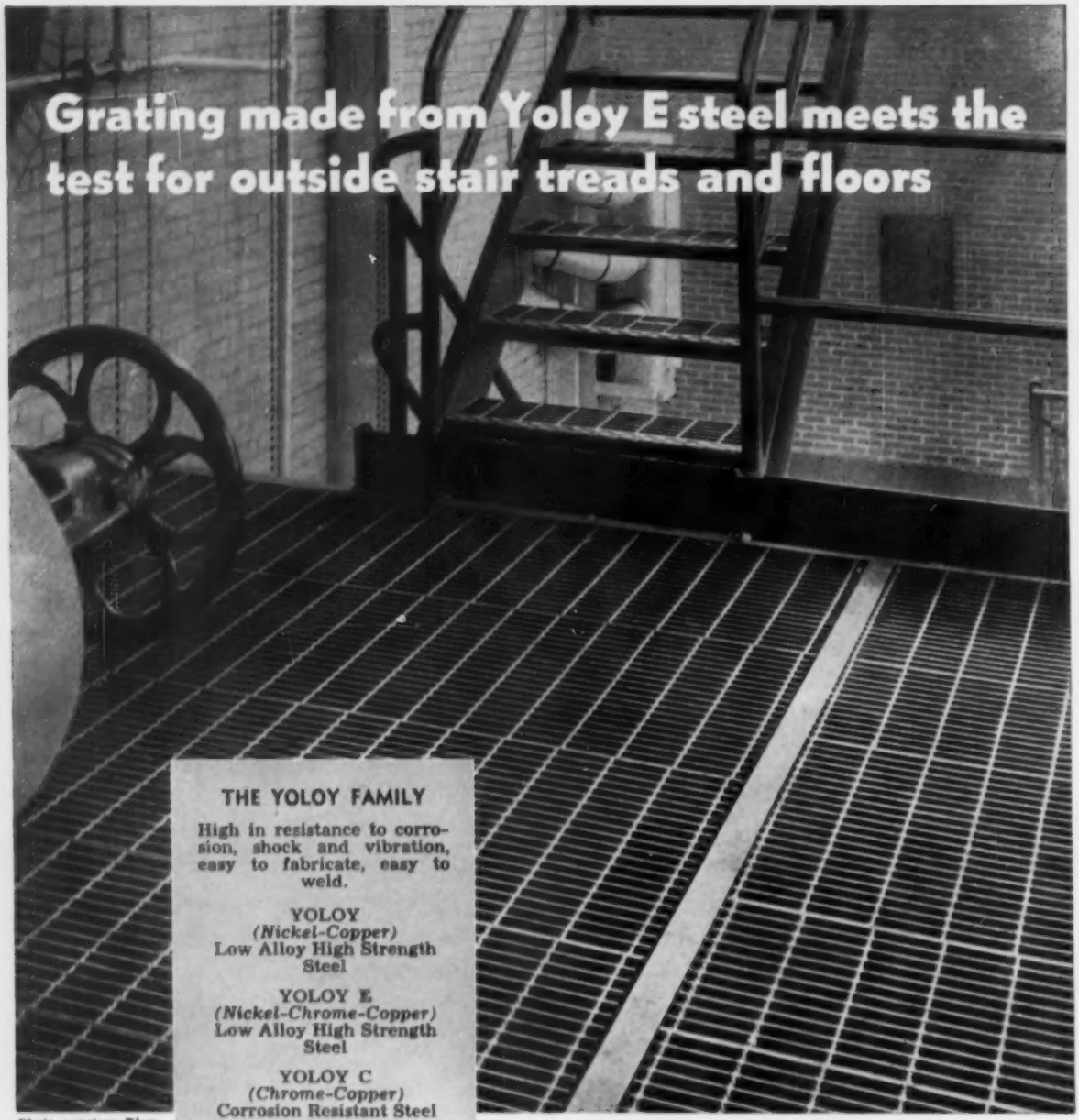


Photo courtesy Blaw-Knox Company.

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

Youngstown

QUALITY YOUNGSTOWN SERVICE

● Safety - durability - atmospheric corrosion resistance - good appearance - all are inherent in this grating fabricated from Yoloy E high-strength steel. The design of such grating contributes toward a non skid surface. The Yoloy family of steels includes several types. For details, write our nearest District Sales Office.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

POP'S school of Filing

"Whaddya want to know about files and filing? Ask Pop —that's me"

"POP the Foreman" is the likeable yet serious-minded imaginative character who for many years has been a "spokesman" for Nicholson through the pages of this and other leading industrial magazines.

"Pop" speaks the conscientious industrial foreman's language on the use, care and selection of files. And being deeply interested in the success of those who employ men like himself, he has a lot of sage thoughts and suggestions that will prove helpful to efficiency- and economy-minded industrial managements.

So the following three pages are turned over to "Pop," who does some interesting "ghost writing" under our sponsorship and supervision.

Nicholson believes in and has for 40 years adhered to the principle of selling to Industrial Users only through Industrial Distributors. As a result, these Distributors and their field men learn how to WORK FOR YOU. They become experts on files and filing—right down into your shop where the right use of THE RIGHT FILE FOR THE JOB counts in the way you want it to count. There are in the U.S. more than 875 near-at-hand Industrial Distributors of Nicholson and Black Diamond files.

REPRINTS of this instructive 4-page advertisement may be had for the asking. How many copies? Write to Nicholson.

3 MORE PAGES

NICHOLSON FILE COMPANY

NICHOLSON U.S.A.

PROVIDENCE 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ont.)

Heavy Filing

USE THE RIGHT FILE FOR THE JOB

Pop says: "Actually there are *thousands* of kinds, cuts and sizes of files. That is because there are thousands of different filing jobs, each of which can be done better by using *the right file for the job.*

"Therein lies the first rule on 'How to get the most out of files.' From the roughest cast-iron filing job (as in the illustration above) to delicate die or fine-instrument finishing (see picture below), the right file enables doing the job properly, whereas the wrong one does not — and often, in fact, ruins the work. The right file saves time because it performs correctly, and usually faster, on the kind of metal or work for which it is designed. The right file permits a greater number of efficient filing strokes — per file and per file cost.

"Many factors enter into the selection of *the right file for the job.* In general, different files are required: (1) to file a flat or convex surface; (2) to file a curved or concave surface; (3) to file an edge; (4) to file a notch, a slot, or a square or round hole.

"But these factors can become complicated by hundreds of combinations with additional factors, such as: (1) the kind of material to be filed; (2) the kind, shape and hardness of the object to be filed; (3) the location, size and character of the surface; (4) the amount of metal to be removed; (5) the degree of smoothness or accuracy required. Therefore, selecting exactly the right file for any particular combination is no easy task. Experience is a good guide—but a slow teacher. However, with the aid of 'File Filosophy' (see last panel), no mechanic need be far off the track to *the right file for the job.*"

Precision Filing

Right Filing

USE THE RIGHT *FILING METHOD*, TOO

Pop says: "Filing is an industrial art. Grip, stroke and pressure must 'fit the job,' *and* the kind of file used.

"FILING ACTIONS. (1) *Straight filing* consists of pushing the file lengthwise —straight ahead or slightly diagonally— across the work. (2) *Drawfiling* consists of grasping the file at each end and pushing and drawing it laterally across the work. (3) *Lathe filing* consists of stroking the file against work revolving in a lathe.

"VISE FILING. For general filing, vise should be at about elbow height; somewhat lower for continuous heavy filing; nearer eye level for delicate work. When necessary to prevent vise-pressure marks, a pair of soft-metal 'protectors' should be placed between the vise jaws. For holding and protecting round pieces, grooved hardwood blocks are sometimes used.

"GRASPING AND 'CARRYING' FILE. In most two-hand filing operations, handle grasp should be 'full' with thumb lying parallel along the top. Point of file is usually grasped by the thumb and first two fingers of other hand, with thumb on top and approximately in line with file. For the lighter strokes, thumb and fingers should be moved toward right-angle position according to pressure required.

"To prevent 'rocking' in flat-surface filing, file should be carried forward in almost a straight line—changing its course just enough to prevent 'grooving.' Apply just enough pressure to keep file cutting and prevent 'slide.' On back stroke lift file clear on hard metals; and with only file-weight contact on soft metals."

Wrong Filing

FILING ROUGH CASTINGS

Pop says: "Snagging castings—removing fins, sprues, and other projections—is very rough work and mighty tough on ordinary files. Their teeth are designed for sharp, fast cutting and therefore do not possess the ruggedness to withstand the shock when driven under pressure against hard projections or sharp edges. Filing of this sort engages only a few teeth at one time, thus putting a severe strain on each.

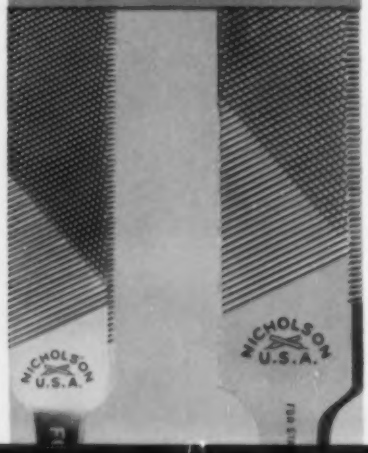
"So, for such work it is best to use a special Nicholson or Black Diamond Foundry file whose teeth are sturdier and have heavy-set edges—to resist shelling or breaking out. While not expected to possess the cutting speed of ordinary files, Foundry files have much longer efficient life on the kind of filing for which they are designed. (Foundry files are also widely used for filing sharp corners of dies.)"

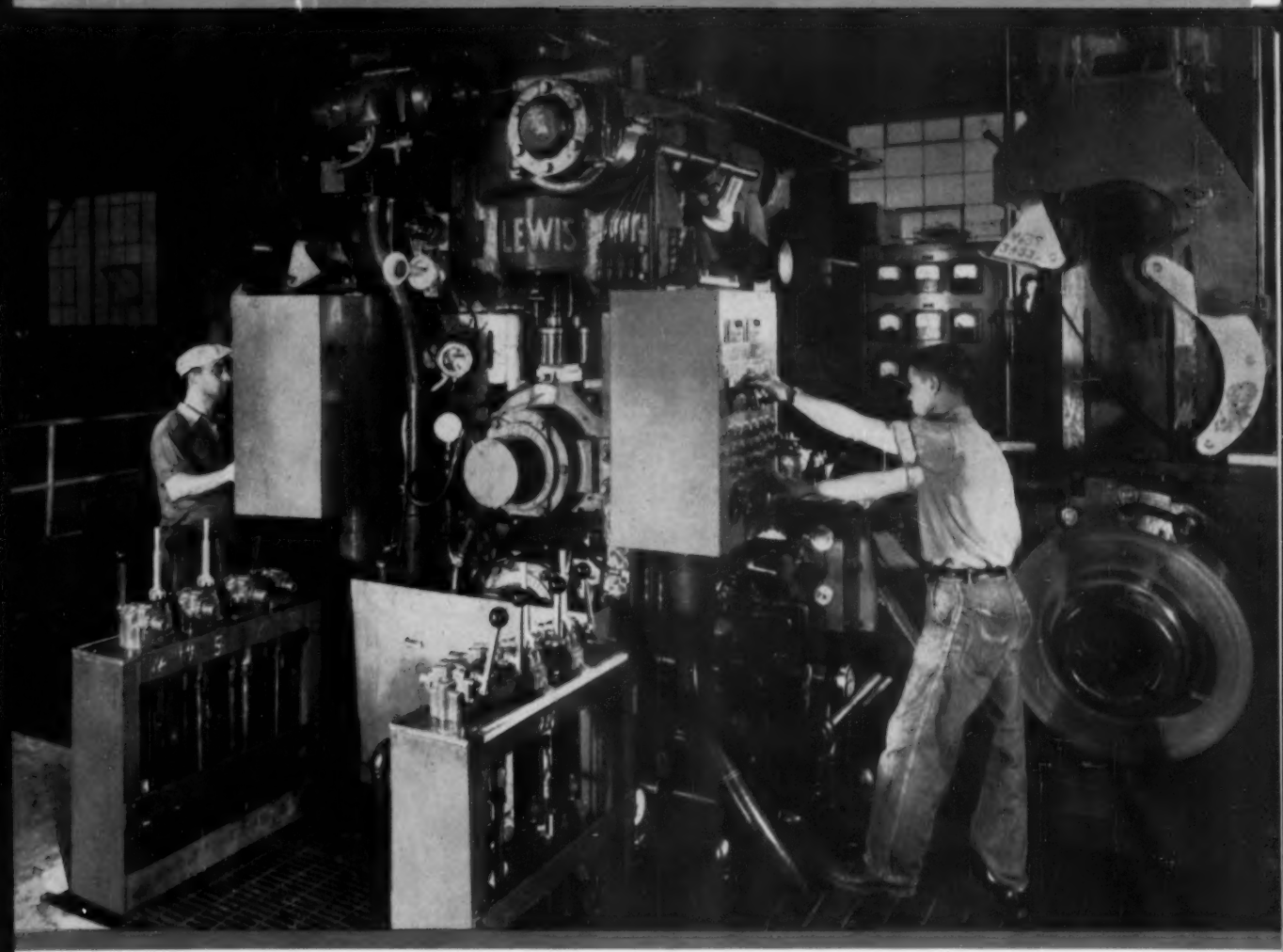
FILING STAINLESS STEEL

Pop says: "The tremendous increase in the use of stainless steel and similar alloy steels has created a new and distinct filing problem. The hard chromium and nickel content of these steels makes them extremely tough and dense. This causes them to have an abrasive action that tends to shorten the life of the general purpose file.

"Nicholson research has overcome this problem with a special file for such steels. It has exceptional wearing qualities. Properly used with light pressure and a slow, steady stroke, this new file removes metal rapidly, requires but little effort and leaves a good finish."

Foundry File *Stainless Steel File*





...new mill performs multiple operations on large variety of re-roll items

With this new Lewis Combination 2-high/4-high Reversing Mill you can economically handle a large variety of re-roll items in small tonnage quantity.

Designed and built by Lewis, the mill can cold reduce steel strip, skin pass, temper roll and gauge correct . . . either light or heavy gauge material . . . at speeds from 600 to 1800 fpm.

When operated as a 4-high mill, using 4½ and 16 x 20 rolls, it has driven back up rolls . . . each roll having its own individual motor without mechanical tie-in. When operated as a 2-high mill, using 21 x 18 rolls, the same motors and drive are used.

First of its kind ever built, this new Lewis Mill makes an ideal investment for any plant that requires a versatile mill to profitably handle a variety of re-roll products.

Whether you may need a mill of this type or some other kind, our experienced engineers and modern manufacturing facilities are always available to design and build sturdy mill equipment to meet your specific requirements.

LEWIS COMBINATION 2 HIGH 4 HIGH REVERSING MILL

BLAW-KNOX COMPANY • LEWIS MACHINERY DIVISION
PITTSBURGH 22, PENNSYLVANIA

BLAW-KNOX

LEWIS PRODUCTS: Two-High Mills • Three-High Mills • Four-High Mills • Strip Mills • Bar, Billet and Structural Mills • Plate Mills • Rod Mills • Coilers • Tables • Shears • Pinion Stands • Gear Drives • Roll Lathes

FILING SOFT METALS

FAST FILING. Pop says: "Take aluminum, a soft, ductile and malleable metal. It is difficult to file with ordinary files because their teeth soon become clogged. For cutting aluminum rapidly, yet leaving a good finish, the Nicholson or Black Diamond Aluminum 'Type A' file is a recent development for: (1) filing the roughness from aluminum castings; (2) filing sheet and bar aluminum; (3) filing aluminum alloys.

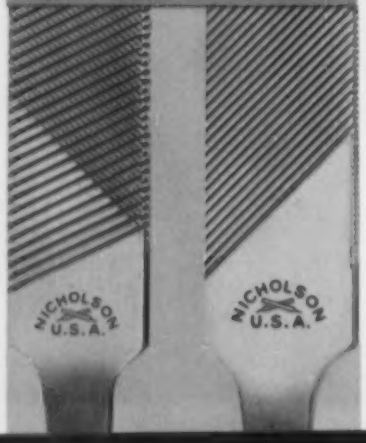
"The upcut of this file is deep with an 'open-throat'; the overcut fine, producing small scallops on the upcut to break up filings, allow file to clear itself, overcome chatter and prevent taking too large a bite.

"Aluminum 'Type A' file is shown below at left."

SMOOTH FINISHING. Pop says: "For soft metals like aluminum, brass, copper, and even plastics, hard rubber and wood —there is a special Nicholson or Black Diamond file called the Shear Tooth which combines fast material removal with excellent finishing qualities. The combination of coarse single cut and long teeth angle of this file provides a smooth shearing action; also minimizes clogging.

"To overcome this file's tendency to run toward the left, it should be used with a somewhat diagonal stroke toward the right. The Shear Tooth is shown below at the right."

Aluminum "Type A" File — *Shear Tooth File*



LATHE FILING

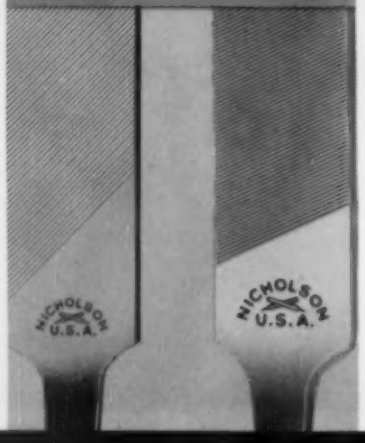
Pop says: "While the ordinary Mill file is normally capable of doing good lathe-filing work, there is a special Nicholson or Black Diamond Long Angle Lathe file with teeth cut at a much longer angle. It provides cleaner shearing and self-clearing; eliminates drag or tear; overcomes 'chatter'; reduces clogging. It is very fast-cutting and produces a fine silken-smooth finish. Its 'safe' (uncut) edges protect any work-shoulders not to be filed.

"Lathe filing is most commonly employed for shaft fitting. High spindle speed should be used; and where stock to be removed is considerable the 12" or 14" size is preferable. For an extra-fine, highly polished finish a Nicholson X.F. Swiss Pattern Hand or Pillar file in No. 4 or No. 6 cut may be used with very good results.

"In using the Long Angle Lathe file, care should be taken at shaft ends and shoulders, as this fast-cutting file may easily cut too deeply at such points. It is also important never to run the hand over the work in the lathe, as accumulated oil and moisture will sometimes coat the work and make it difficult for the file to take hold again.

"In lathe-filing work that is oval, elliptical or irregularly rounded, the finer or lighter cutting Nicholson X.F. Swiss Pattern files will be found most satisfactory. They are made in a wide range of shapes, sizes and cuts. Long Angle Lathe file (left) is shown below in contrast with ordinary Mill file (right)."

Long Angle Lathe File — *Mill File*



PRECISION FILING

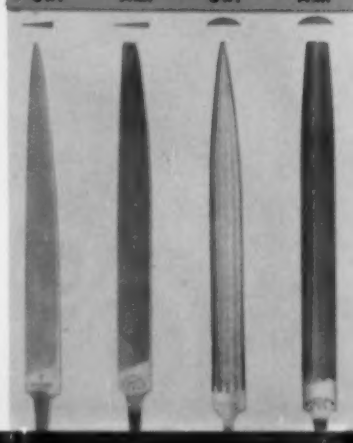
Pop says: "Die and pattern making, model building, precision-instrument making and repairing have gained tremendous impetus in aircraft, automotive, engine, machine-tool and other rapidly expanding industries. All these—to say nothing of the long-established watch, clock, jewelry and kindred industries—require precision files of innumerable shapes, cuts, sizes and purposes.

"While for many kinds of work regular files are all that are required, Swiss Pattern files—made to very exacting measurements and finer cuts—are necessary for the more particular purposes mentioned above.

"In precision filing all the elementary rules for general filing apply. The flat precision files should be used with a slow, smooth action, with the forward stroke moving the file laterally along the work. In using the round or half-round types, the file should be turned clockwise as the stroke is made, to assure a deeper cut and a smoother finish.

"There are many instances — in model and fine-instrument making, for example —where intricate fit-filing is necessary on small forms of wood, plastics or other non-metallic materials. Swiss Pattern files are perfectly adequate for such purposes, provided they are used while sharp and kept clean with a file brush. Contrasting views of typical American and Swiss Pattern files are shown below. By the way, Nicholson X.F. (meaning Extra Fine) Swiss Pattern files are the largest line of their kind in the world."

Sw. — *Am.* — *Sw.* — *Am.*



FILING FLAT AND CURVED SURFACES

Pop says: "Milled Curved Tooth files cover a distinct filing field and have a considerable range of shape and structural characteristics. Unlike the chisel-cut teeth of regular files, these curved file teeth are *milled* in with a precision that gives them almost 'razor sharpness.'

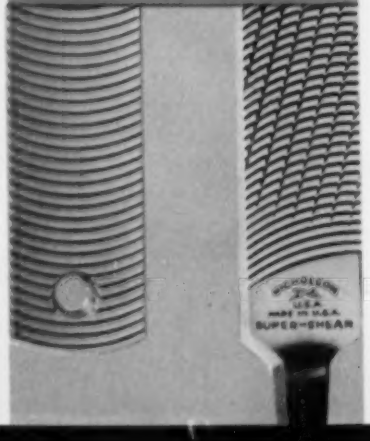
"Curved Tooth files are widely used in the automobile manufacturing and repair industries for work on aluminum and sheet steel (on flat or curved surfaces). They are also used on such soft metals as brass and babbitt, and often on iron and steel in general. Because of their curved teeth they readily clear themselves of chips and have the correct rake for speed and economy.

"Nicholson Superior Curved Tooth files are made in both Rigid and Flexible forms —the Rigid, either tanged for the conventional handle or plain (with hole at each end) for special holders; Flexible, plain only—for use in special holders on concave surfaces. Standard, Fine and Smooth cuts; in parallel Flat, Square, Pillar, Pillar Narrow, Half Round, Shell and Moulding types.

"A special Curved Tooth file is the Super-Shear. Exclusive with Nicholson—its teeth, divided by angular longitudinal serrations, are cut in an 'off-center' arc. This gives them virtually a right angle and wide gullet toward one edge — for fast cutting; also a longer, shearing angle and narrow gullet toward the other edge—for smoothing. Practically two files in one!"

NICHOLSON U.S.A.

Plain Flexible Curved Tooth File — *Super-Shear—Special Curved Tooth File*



THE CARE OF FILES

Pop says: "File life is greatly shortened by improper care as well as by improper use—and improper selection. Some useful 'Do's' and 'Don'ts' are offered here:

"Files should never be thrown into a drawer or tool box containing other tools or objects. They should never be laid on top of or stacked against each other. Such treatment ruins the cutting edges of their teeth.

"Keep files separate — standing with tangs in a row of holes or hung on a rack by their handles.

"Keep files in a dry place so rust will not corrode their teeth points.

"It is also of great importance to keep files clean of filings or 'chips,' which often collect between the teeth during use. After every few strokes the good mechanic taps the end of the file on the bench to loosen these 'chips.'

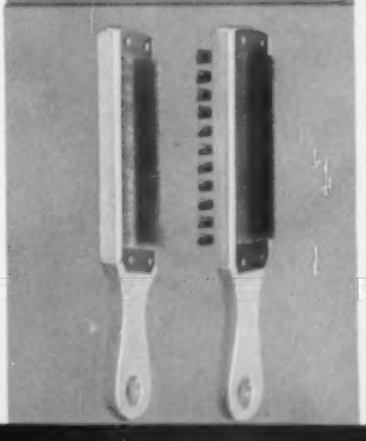
"The filer should also have on hand a file card or brush. With it the teeth of the file should be brushed frequently — and always before putting the file away.

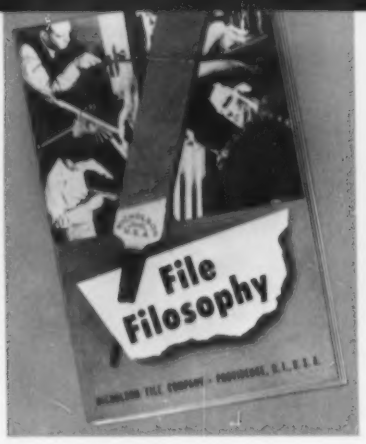
"To remove obstinate 'pinnings' which sometimes clog up the teeth and cause scratches on the work, a 'scorer' made of soft metal is often a further help.

"Oil or grease on files should be removed with chalk.

"File card (left, below) is for more general use. File brush and card (right, below) is used especially on the finer cut files."

File Card — *File Brush and Card*





"FILE FILOSOPHY"— FAMOUS NICHOLSON BOOK ON FILES AND FILING

Pop says: "And the foregoing isn't the half of it! It's just some samples of the things Nicholson's *new 50-page edition* of 'File Filosophy' tells about.

They are also typical of the subjects used by Nicholson technical specialists available for meetings and slide-illustrated lectures through arrangements with Nicholson's Industrial Distributors.

"Further discourses, descriptions and illustrations on files and filing cover such subjects as:

- A Bit of File History
- Important Steps in File Making
- File Kinds, Shapes, Cuts and Cross Sections
- Mill and Other Types of Saw Files
- Machinists' Files
- Rasps
- File Terminology
- More About Special Purpose Files
- More About Precision Filing (Swiss Pattern Files)
- More About Milled Curved Tooth Files
- Hand, Band, Circular, Crosscut and Other Saw Filing
- Saw Chain Filing (a new chapter)
- Sharpening Tools and Implements
- Rotary Files and Burs (a new chapter)

"Let me send you this 'mechanics' textbook.' Every industrial production head, purchasing agent and tool keeper should have a copy. Just write to 'Pop,' care of Nicholson File Co., 23 Acorn Street, Providence 1, R. I."

NICHOLSON FILE CO.

PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada, Ltd., Port Hope, Ontario)

NICHOLSON U.S.A.

POP'S school of filing

"Whaddya want to know about files and filing? Ask Pop —that's me"

"POP the Foreman" is the likeable yet serious-minded imaginative character who for many years has been a "spokesman" for Nicholson through the pages of this and other leading industrial magazines.

"Pop" speaks the conscientious industrial foreman's language on the use, care and selection of files. And being deeply interested in the success of those who employ men like himself, he has a lot of sage thoughts and suggestions that will prove helpful to efficiency- and economy-minded industrial managements.

So the following three pages are turned over to "Pop," who does some interesting "ghost writing" under our sponsorship and supervision.

Nicholson believes in and has for 40 years adhered to the principle of selling to Industrial Users only through Industrial Distributors. As a result, these Distributors and their field men learn how to WORK FOR YOU. They become experts on files and filing—right down into your shop where the right use of THE RIGHT FILE FOR THE JOB counts in the way you want it to count. There are in the U.S. more than 875 near-at-hand Industrial Distributors of Nicholson and Black Diamond files.

REPRINTS of this instructive 4-page advertisement may be had for the asking. How many copies? Write to Nicholson.

3 MORE PAGES

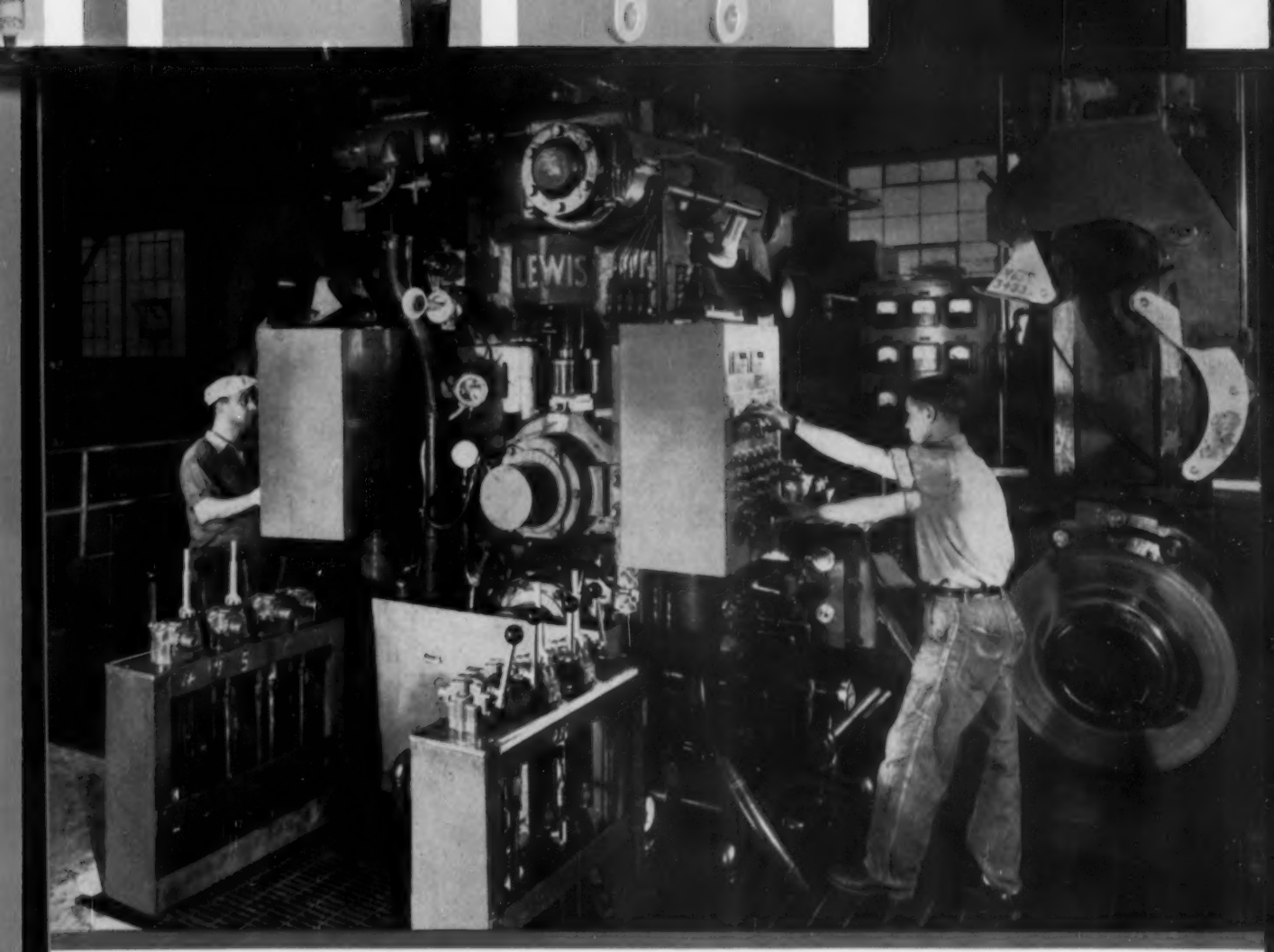
NICHOLSON FILE COMPANY

NICHOLSON U. S. A.

PROVIDENCE 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ont.)

BLACK DIAMOND



. . . new mill performs multiple operations on large variety of re-roll items

With this new Lewis Combination 2-high/4-high Reversing Mill you can economically handle a large variety of re-roll items in small tonnage quantity.

Designed and built by Lewis, the mill can cold reduce steel strip, skin pass, temper roll and gauge correct . . . either light or heavy gauge material . . . at speeds from 600 to 1800 fpm.

When operated as a 4-high mill, using 4½ and 16 x 20 rolls, it has driven back up rolls . . . each roll having its own individual motor without mechanical tie-in. When operated as a 2-high mill, using 21 x 18 rolls, the same motors and drive are used.

First of its kind ever built, this new Lewis Mill makes an ideal investment for any plant that requires a versatile mill to profitably handle a variety of re-roll products.

Whether you may need a mill of this type or some other kind, our experienced engineers and modern manufacturing facilities are always available to design and build sturdy mill equipment to meet your specific requirements.

LEWIS COMBINATION 2 HIGH 4 HIGH REVERSING MILL

BLAW-KNOX COMPANY • LEWIS MACHINERY DIVISION
PITTSBURGH 22, PENNSYLVANIA

BLAW-KNOX

LEWIS PRODUCTS: Two-High Mills • Three-High Mills • Four-High Mills • Strip Mills • Bar, Billet and Structural Mills • Plate Mills • Rod Mills • Coilers • Tables • Shears • Pinion Stands • Gear Drives • Roll Lathes

wanted: more

Management men are discovering the tremendous production gains and cost savings that result from uninterrupted operation of an entire stamping line. Since Danly Presses offer *maximum freedom from mechanical failure,* lines composed entirely of Danly Presses can produce more finished stampings per shift without work stoppage, without high maintenance costs in time and labor.

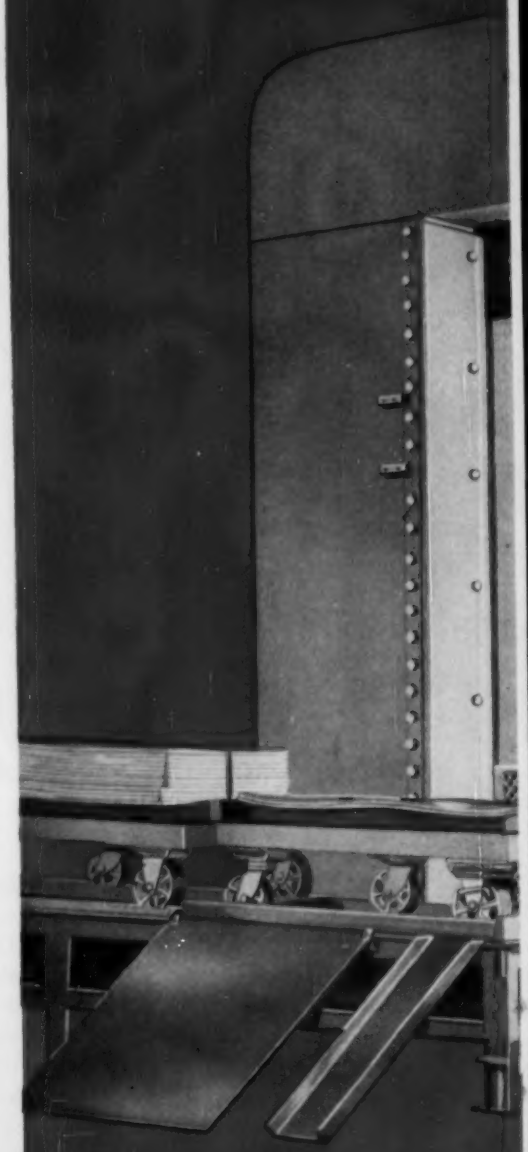
Danly Press lines actually turn out more finished stampings per hour, too. Danly Drawing Presses, pace-setters for the line, are designed with a special slide motion that doubles stroking rate without exceeding safe drawing speed. Output from these Danly Drawing Presses keeps the whole line working at full capacity.

Now—why are Danly Presses able to provide such remarkable advantages? For the most part, it's due to Danly's special design and heavier construction. Pressurized *oil* lubrication reduces maintenance by hundreds of hours every year. Heavier, more rugged construction meets day in and day out peak-load requirements. Danly's cool-running clutch and brake wear less . . . run longer before replacement. Simplified electrical and pneumatic control devices increase both operator and machine safety.

Because press downtime losses affect *your* entire production setup, it will pay to have a Danly Press engineer give you the complete story on how to lick this problem. Write or phone today.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 50, Illinois

DANLY®
HYDRAULIC METALWORKING EQUIPMENT
MECHANICAL PRESSES . . . 50 TO 3000 TONS



It costs less to run a DANLY PRESS line!

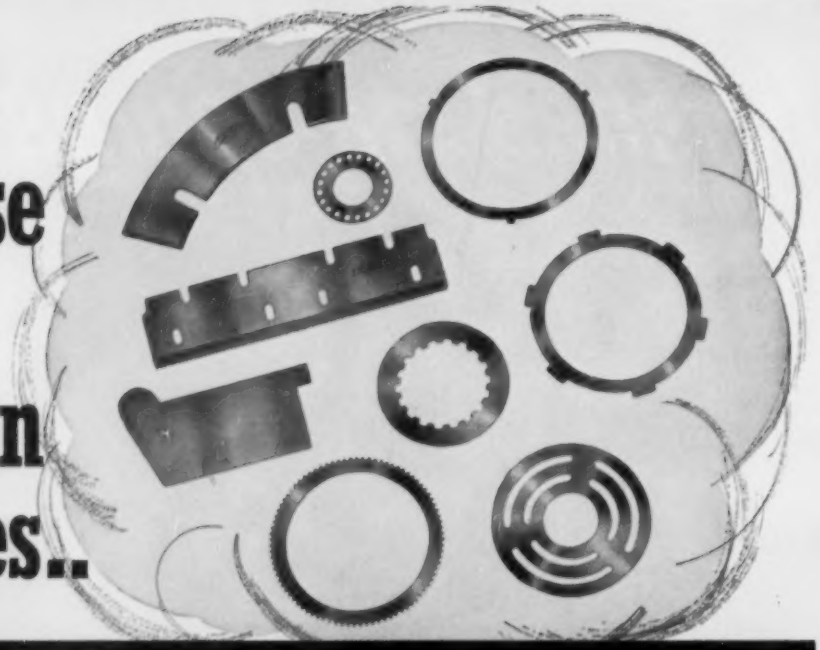
specify: A NEW

finished stampings per shift

This new Danly line is setting records for production and continuous operation in a leading automotive stamping plant. The adjustable operator control arms offer greater convenience for any setup. Built-in controls reduce the hazard of damage due to aisle traffic. Danly offers any presses you need to make up your line . . . single, double or triple action . . . overdrive or underdrive . . . from 50 to 3000 tons.

DANLY PRESS LINE

If Parts Like These are Production Headaches..



then make SIMONDS Special Parts Division part of your own production line!

- Heat Treated Discs — all types
- Valve Discs (Compressors)
- Clutch Discs (Multiple Disc Type)
- Aircraft Engine Discs
- Machine Parts (Flat Steel)
- Wear Plates (Ways, etc.)
- Blades — All types — plain — toothed — beveled (For cutting or scraping)
- Circular Cutters for all types of cutting
- Irregular Shaped Cutters — All types
- Heat Treated Liner Plates
- Rectangular Plates — All types

If you're having difficulty manufacturing (or obtaining) any *FLAT STEEL PARTS* . . . especially parts that require heat treating and grinding . . . then here's your headache powder.

Simonds Special Parts Division can be your production line for these parts . . . raw steel from Simonds Steel Mill in Lockport, N. Y., fabricated into your part at Simonds Famous Windowless Plant in Fitchburg, Mass.

Simonds Special Parts Division is fully equipped to produce precision parts for aircraft engines, printing presses, slitting machines, air compressors and numerous other applications. Clutch discs for coal handling equipment, machine tools, marine transmissions, etc., is another Special Parts Division item. Send your inquiries, with full specifications or blueprints, direct to Simonds Special Parts Division, Fitchburg, Massachusetts.

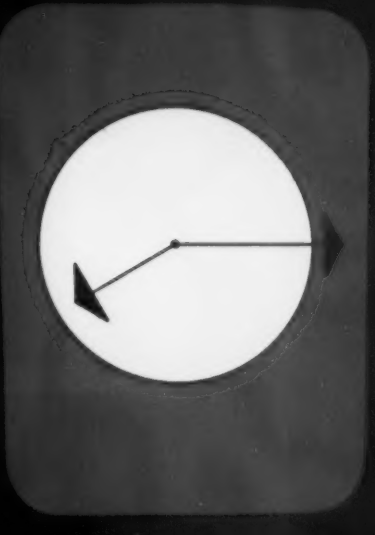
SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

For Fast Service from Complete Stocks

Call your SIMONDS Industrial Supply DISTRIBUTOR

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon • Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. • Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada

it takes only 15 minutes to do 5 hours' work



with a **WHEELABRATOR**®

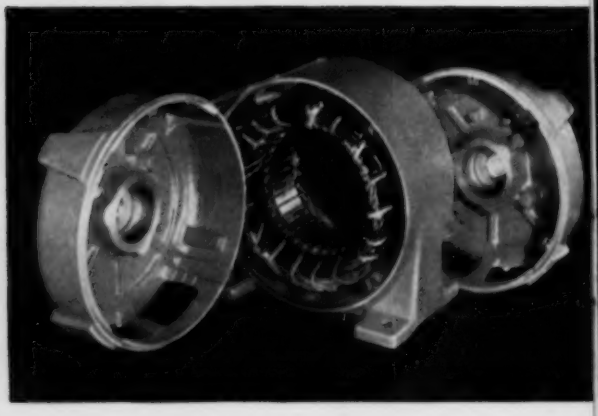
Here's a typical example of the time-and-cost-slashing advantages of Wheelabrator airless abrasive blast cleaning equipment. In just 15 minutes, a Wheelabrator Tumblast cleans loads of non-ferrous castings at National Brass Co. — a 5 to 6 hour job by airblasting. Think what these savings would mean in terms of your production. Investigate the Wheelabrator today. Write for Catalog No. 74C.

American
WHEELABRATOR®

trail blazer of industrial progress

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 505 S. Byrkit St., Mishawaka, Indiana

MOTOR FACTS ON INDUSTRY'S
MOST-PREFERRED "POWER PACKAGE."



Electrical System Fact: New fortified insulation includes exclusive Bondar, Bondite and Mylar* for greater protection against the toughest operating conditions.

*Du Pont registered trade-mark

FACT:

The new Life-Line A has stronger insulation than any other motor on the market

Meaning what? Simply that the new Westinghouse Life-Line® "A" motor with new fortified insulation can withstand heavier overloads and operate at higher temperatures than any other motor you can buy.

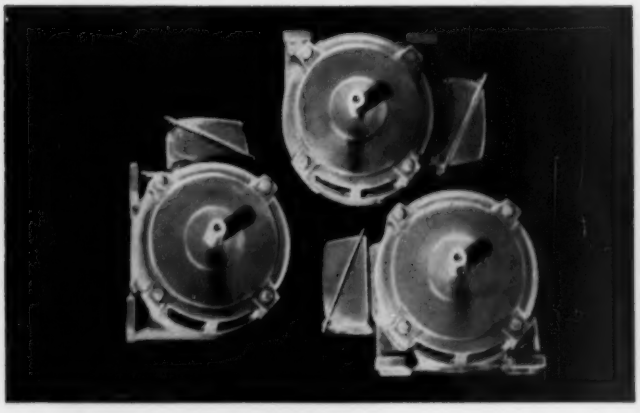
Similar design advances in the mechanical and lubrication systems make Life-Line "A" industry's most preferred motor.

It takes the right combination of *all three systems*—electrical, mechanical and lubrication—to build the best package of power on the market.

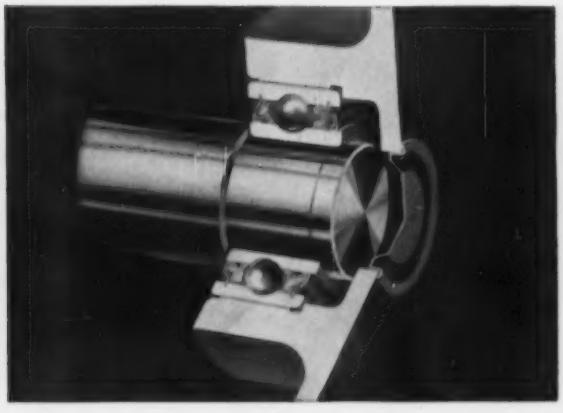
Get all the facts by calling your Westinghouse sales engineer . . .
The Man With The Facts!

J-21877

YOU CAN BE SURE...IF IT'S
Westinghouse



Mechanical System Fact: New cast-iron housing on both drip-proof and totally-enclosed types. Ventilation openings only in end brackets make the motor drip-proof whether mounted on floor, ceiling or wall.



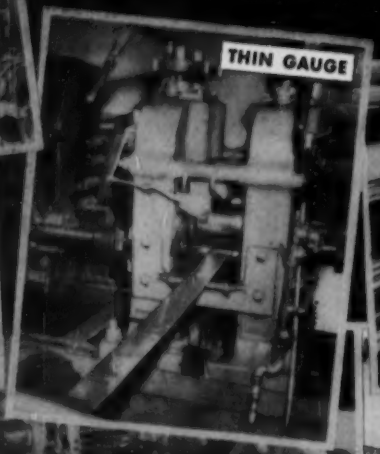
Lubrication System Fact: New "4-way sealed", pre-lubricated bearing eliminates completely the 3 main causes of bearing failure: 1) contamination, 2) over greasing, 3) wrong grease.

ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.

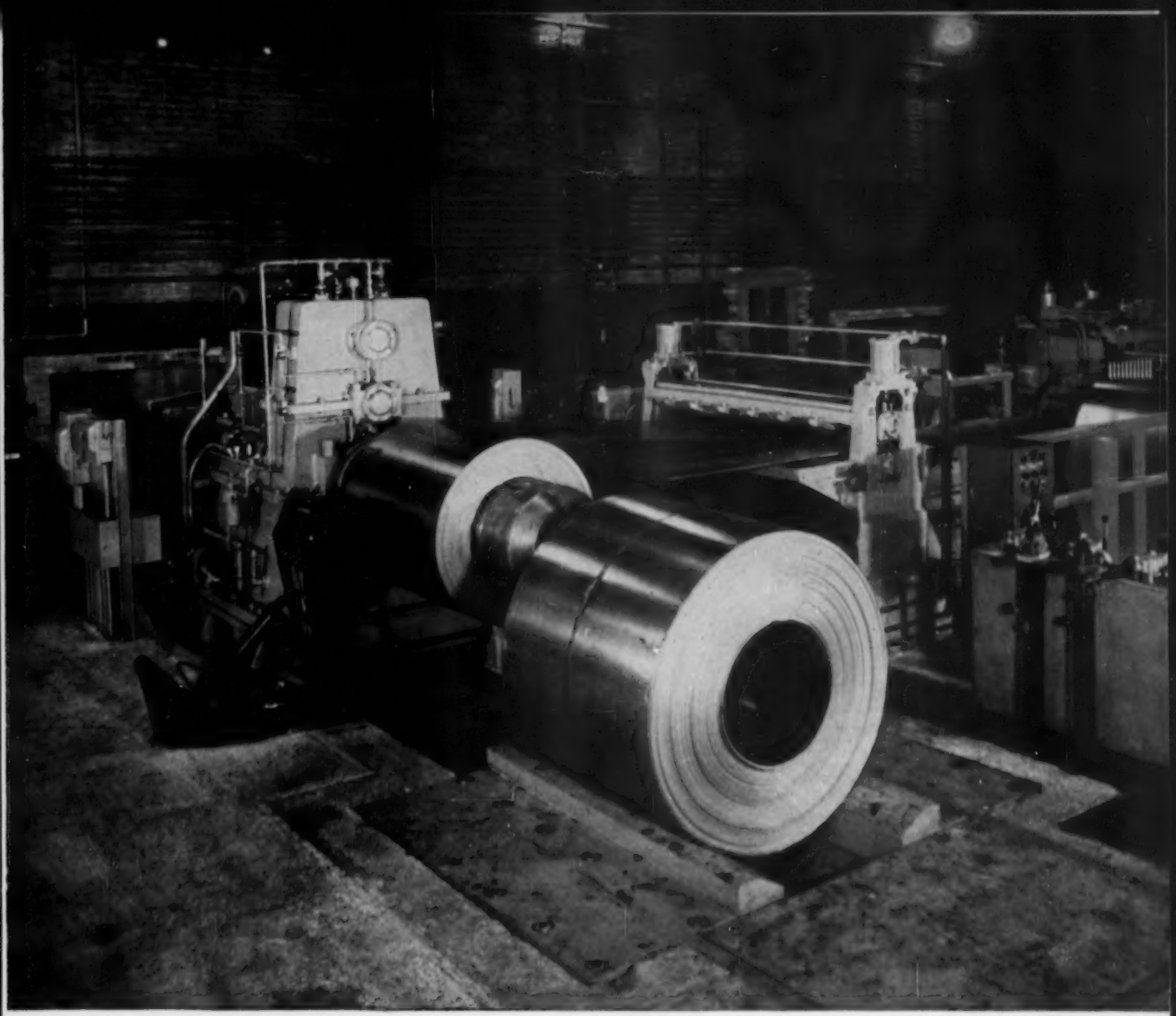
COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
Inquiries for small lots welcomed.



ULBRICH Stainless Steels

WALLINGFORD, CONN.
Phone: Wallingford 9-7771



Wean Flying Shear Line (Entry End)

The WEAN ENGINEERING COMPANY, Inc.

WARREN ---------- OHIO

In the past decade steel making has made advancements in product development and production unmatched by any other industry.

The demand for better, more versatile steels, at rates that a few short years ago were beyond comprehension, has furnished the impetus. But the backbone of this tremendous revolution has been supplied by experienced metallurgists, who developed the materials, and engineering firms, like Wean, who designed and built the machinery necessary.

Equipment designed and built by Wean continues to establish performance records wherever it is in operation. This is the kind of progress that causes leading steel producers the world over to make certain they talk with Wean before they buy.

SPECIALISTS IN SHEET, STRIP AND TIN MILL EQUIPMENT

How a shift in gears saved $256,000

Five million MUELLER BRASS CO. forged ring gears improve automatic transmission operation . . . at lower cost to the manufacturer.

Ever since one of the leading manufacturers of automotive transmissions began using ring gears forged from Mueller Brass Co. bearing bronze, production costs have been cut nearly $256,000. That's because the rough forging weighs less and is closer to finished size than a sand cast ring gear formerly used. This shift in gears resulted in a savings in metal costs, greatly reduced machining time and increased tool life. In addition, the use of forged gears has cut scrap loss and eliminated costly inspection rejects.

The performance of these forged ring gears is also far superior to the sand cast gear, which had a tendency to flake away and crack around the teeth, causing failures. More than five million forged ring gears have now been used in these transmissions without a single failure. Being porous, the sand casting was difficult to balance, but the forging has a dense, homogeneous structure that helps keep it in perfect balance.

Strong, long-wearing non-ferrous metal parts, forged to your specifications by Mueller Brass Co., can help reduce your costs and improve the performance of your products just as they have done in this transmission application. For complete information, write us today.

Write today for your complete set of Mueller Brass Co. engineering manuals.

MUELLER BRASS CO. PORT HURON 24, MICHIGAN

154

GENERAL REFRACTORIES

FILET MIGNON—a la BRICK Sizzling, savory, juicy—dripping with butter—dashed with Worcestershire—and all of it brought to your table because of brick—refractory brick.

Refractories that contain the flames of industry. That produce the steel for your stove, your cabinets, your cooking utensils . . . provide the heat for the oven, the cold for the refrigerator . . . make rails, cars and engines which bring your steak to town; the wheels, body and motor of the truck which delivered it to the butcher. The platter on which it is served. The knife to cut it. The fork to eat it. The lights for the table. All—born of refractories.

Practically everything made or moved requires refractories. Refractories of almost infinite variety, prescribed and tailored for each special task.

Developing them, producing them, applying research to their improvement, drawing on resources all over the world, is the complete refractories service that we provide to industry, everywhere.

GENERAL REFRACTORIES COMPANY
PHILADELPHIA 2

A COMPLETE REFRACTORY SERVICE

OLIVE HILL— The world's most renowned blast furnace brick (it is a strong and dense fireclay product)—with superior resistance to slag, load, abrasion, carbon disintegration, and alkali attack.

RITEX—Unburned basic brick—in magnesite, magnesite-chrome, and chrome-magnesite. More resistant to spalling. Lower porosity, lower thermal conductivity—high hot strength.

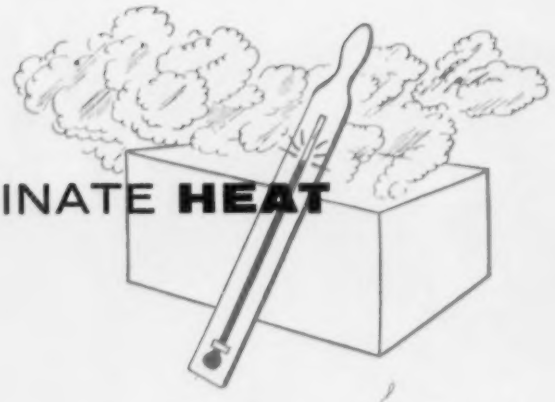
STEELKLAD— A Ritex basic brick, permanently jacketed in a patented steel shell. Just one of many superior GREFCO products.

NEW HOUGHTON COLD CLEANERS

Yes, Houghton new cold cleaners make hot, steamy, dangerous metal cleaning processes obsolete!

Whether your metal cleaning requirements call for production line power washers or dip tank methods, there is a Houghton Cold Cleaner to do the job. These new Cold Cleaners not only eliminate the need for costly, uncomfortable heating of cleaning compounds and the dangers of low flash point solvents and toxicity but they do a better, quicker, more thorough cleaning job at less cost!

Take the first step now to modernize and improve your metal cleaning processes. Ask your Houghton Man about these new Cold Cleaners, or write for the new Cold Cleaner bulletin. E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pennsylvania.



ELIMINATE **HEAT**

ELIMINATE **FIRE HAZARD**

ELIMINATE **TOXICITY**

FROM METAL CLEANING OPERATIONS

HOUGHTO-CLEAN COLD CLEANERS

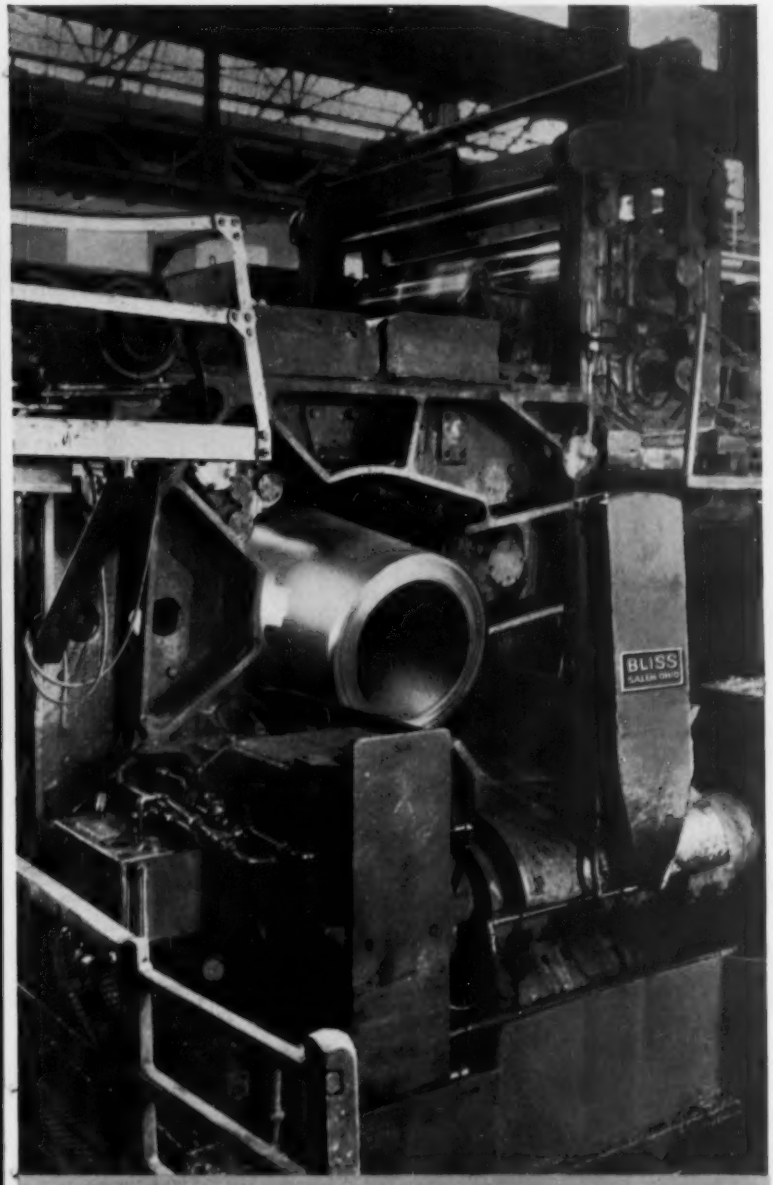
. . . products of

E F HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

At Great Lakes Steel, too—



A BLISS HOT MILL DOWNCOILER

This 28" x 96" Bliss hot mill downcoiler at the Great Lakes Steel Corp., Detroit Division of National Steel Corp., is but one of a number of downcoiler installations designed and built by Bliss since it pioneered the development of these expanding mandrel type downcoilers.

Similarly significant installations include Bliss coilers at U. S. Steel Company plants, and others at Ford Motor Company, Youngstown Sheet & Tube Company, Brazilian National Steel Company and August Thyssen Hutte A.G. (Western Germany).

While these coilers vary in size, the expanding mandrel feature, common to all, makes possible high-tension coiling—results in tightly wound, solid, smooth-edged coils. Moreover, the collapsible feature facilitates stripping of finished coils...eliminates surface damage.

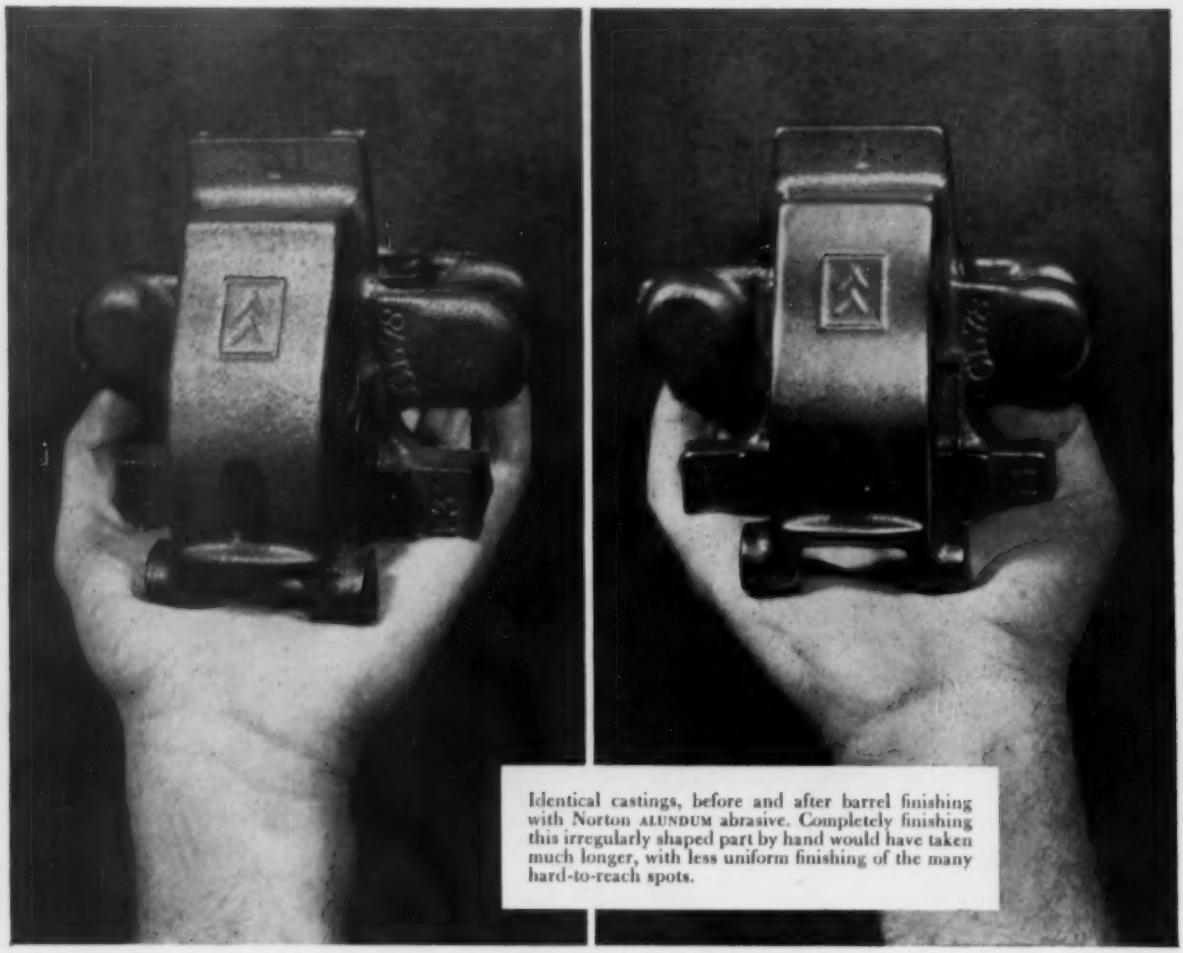
For more complete information on these and other installations, write for a copy of our 60-page Rolling Mill Brochure, Catalog 40-A. It's yours for the asking.

E. W. BLISS COMPANY, General Office: Canton, Ohio
ROLLING MILL DIVISION: Salem, Ohio

BLISS
SINCE 1857

is more than a name...it's a guarantee

PRESSES, ROLLING MILLS, SPECIAL MACHINERY
Plants: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California



Identical castings, before and after barrel finishing with Norton ALUNDUM abrasive. Completely finishing this irregularly shaped part by hand would have taken much longer, with less uniform finishing of the many hard-to-reach spots.

ALUNDUM* tumbling abrasive tames another tough one!

Intricate parts finished faster, more thoroughly, when Norton abrasive adds the "TOUCH of GOLD"

The trickier, more intricate the parts, the easier it is to see the many advantages of barrel finishing with ALUNDUM tumbling abrasive. Hand finishing the casting illustrated, for example, would have been a long, tiresome chore — and an uneven job at best, due to the many irregularities of shape.

For parts ranging from even heftier castings down to tiny needles, there's nothing like ALUNDUM abrasive to bring out *all* the benefits of barrel finishing. This typical Norton abrasive development is sharp, dense, hard and non-fracturing. Its blocky shape eliminates slivers and chips in the tumbling process. In your tumbling barrels it assures:

- *Highest uniformity of radii and surfaces, with brightest, smoothest finish.*
- *Continual savings of man-hours, by reducing tumbling cycles, scrap and reworking to minimum.*

See Your Norton Distributor

for further facts on how ALUNDUM abrasive can add the time-saving, profit-boosting "Touch of Gold" to your finishing operations. Ask him for the new 55-page booklet on barrel finishing. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. 6281

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

Making better products... to make your products better

and its BEHR-MANNING division

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

Built stronger, tougher and lighter with USS MAN-TEN Steel

Famous HYSTER Logging Arch handles more footage faster

In this "packaged" logging unit, consisting of a Hyster Arch Towing Winch and Caterpillar Diesel Tractor, the objective of the engineers was to produce equipment having the highest degree of mechanical efficiency, plus durability and speed of operation.

Because the key to profits is greater log production, which means that unnecessary breakdowns must be eliminated, extra margins of safety have been built into all parts subjected to stresses and wear.

By using USS MAN-TEN High Strength Steel in the arch boom, A-frame and tongue, it was possible to reduce weight of these important members by 10%, and yet to *increase* their strength-to-weight ratio over former construction.

The increased strength provided by MAN-TEN Steel gives the arch the ability to handle log loads of maximum size, and the reduced arch weight means greater mobility and maneuverability. Result: The operator can get into tight spots easier and pick up loads faster. Reduced weight also permits greater grade climbing ability in steeper terrain.

With USS High Strength Steels — USS MAN-TEN, USS COR-TEN and USS TRI-TEN—you can build extra strength and toughness into vital parts and ensure greater resistance to wear, fatigue, abrasion and impact.

Photographs courtesy of HYSTER COMPANY, Portland, Oregon

SOON TO BE ISSUED — Our new "Design Manual for High Strength Steels" contains comprehensive and practical information that you will find extremely useful in designing your equipment for greater economy and efficiency by the sound use of high strength steels. Watch our future advertisements for the announcement of the availability of this important publication.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS MAN-TEN HIGH Strength STEEL

USS

9-1028

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station

UNITED STATES STEEL

Over 22 tons of die block for "IMPRESSIONS THAT LAST"

Another example of Finkl dependability and craftsmanship are these die blocks each of which is 13"x77"x79" and weigh 22,710 pounds. The face and two ends have been rough carbide milled. The steel is Finkl FX, heat treated to Temper 3 which is 331-302 B.H.N. FX blocks are tough, resistant to checking and washing, and free from temper brittleness. FX can be furnished in special shaped sections of large and small sizes such as rings, discs, round, square, rectangular or half round bars.

From steel making, where quality of material begins, through forging, heat treating, rough and finished machining, and metallurgical testing where quality of workmanship counts, Finkl standards are the highest. For 76 years we have proved that the best is the least costly in the long run. Next time you are considering die blocks or forgings choose Finkl and you will choose the finest.

Write for this free catalog telling all about Finkl die blocks and forgings, the types of steel, the proper selection for the job, how to make dies last longer, and many other helpful facts. Please send request on your company's letterhead.

Call your nearest Finkl representative

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Western Warehouse **LOS ANGELES:** Finkl Steel Products Corp., 10735 Sessler Ave., LOrain 6-2134
Eastern Warehouse **EAST CAMBRIDGE 41:** Industrial Steels, Inc., 250 Bent Street, ELliot 4-7650

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FORGINGS • DIE BLOCKS • ELECTRIC FURNACE STEELS

. . . IF IT'S A HIGH PRODUCTION PROBLEM . . .

ASK BAIRD ABOUT IT

It's

"GOOD FORM"

TO MAKE YOUR **RIBBON METAL** PARTS ON THE **BAIRD** AUTOMATIC

After completion of the tooling setup and adjustment of the several mechanisms, you merely start the machine for fully automatic production.

Baird standard automatic Four-Slide Ribbon Metal Forming Machines are capable of producing thousands of shapes and sizes of products and components. In addition, various accessories, attachments, and special cams extend production possibilities to an uncountable quantity. The machine may be arranged to handle round wire if required.

Speed is the low-cost factor; smooth, reliable operation is another; also, easy access to tooling and inspection of work.

The story in detail is too long to present in this space, so you will want full particulars. This is the one machine you need to give you unusually fast and accurate production. "Ask Baird about it." Write Dept. IA-4.

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

1BA55

Newton Vertical
Rotary Milling Machine

CONSOLIDATED MACHINE TOOL

A Division of Farrel-

TWO IN ONE

Here is a Newton Vertical Rotary set up for milling diesel engine oil pans. The head feeds along the cross-rail and mills the piece in one pass.

At the end of the cut, the spindles unclamp and retract. As the head returns to its starting point on the cross-rail, the table is automatically power indexed. The spindles lower and clamp and the next pan is milled.

This machine may run several weeks on oil pans. Then, by locking the head on the cross-rail and engaging the rotary table feed, it becomes a continuous rotary milling machine for an entirely different type of job! (Fixture change-over time—less than one hour.)

Two entirely different machines for not much more than the price of one. A good example of Consolidated's utility minded engineering.

COMPANY, ROCHESTER 10, N. Y.

Birmingham Company, Incorporated

No. 1 in a series

AHEAD

STEPS

You get demonstration of your work and complete job development record

FOUR

Cone submits samples of your work

BE

Cone makes recommendations

You send print to Cone

Cone's four-step carbide development service obligates no one to purchase a Conomatic. It simply demonstrates what it takes of machine, personnel, and tools for profitable use of 100% carbide tooling on multiple spindle bar automatics.

Clients of this service have praised it highly. Some have used it for immediate production advantage. A lesser number have used it in preparation for anticipated competition later. All are completely convinced that an "automatic" proved superior for carbide is a superior "automatic" for hss.

DATA FOR COMPARISON

Part.....Support Post	Length.....5¾" Cutoff 4¼" Turn 2" Thread
Machine.....1⅜" Conomatic	
Tools....100% Carbide Tipped	RPM.....1562 Work Spdl. 1022 Thr'd Spdl. 2584 Total Eff.
Material.....X-1112	
Stock Size.....1¼"	Time.....15 Secs.

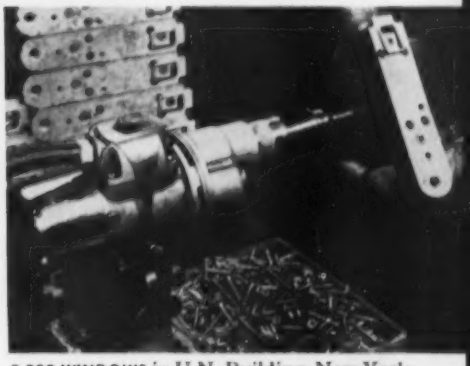
Conomatic

Write, wire, or phone today for particulars on "Four Steps With Cone".

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

TEN IN THE TOP. 10 Phillips self-tapping screws hold top panel to the frame of the Fedders ¾ ton room air-conditioner. "We found employees on the assembly line are the best salesmen for Phillips screws," says the assistant plant manager. "Rapid driving of the screws is important to them because they are on piecework."

STEADY ON THE STABILIZER. Here is the final assembly of the top cover of a horizontal stabilizer at Republic Aviation. The purchasing agent said, "You can really foul it up with one of those speed guns if it slips out of the screw slot, but the Phillips type head helps to prevent slipping. It holds on to the driver bit much better than the old-type screw."



5,000 WINDOWS in U.N. Building, New York City, have Caldwell clock spring sash balances. "We depend on the worker's adjustment of the Phillips head screw to make the balance function perfectly," says Caldwell's production manager. "We now use two sizes of Phillips recessed-head screws . . . and have speeded assembly. Our power drivers are mounted horizontally, since we discovered the units are easier to move around than the drivers."

NEW DISCOVERIES IN ASSEMBLY

Many manufacturers in many fields are finding Phillips Cross-Recessed-Head Screws lead to better methods and results

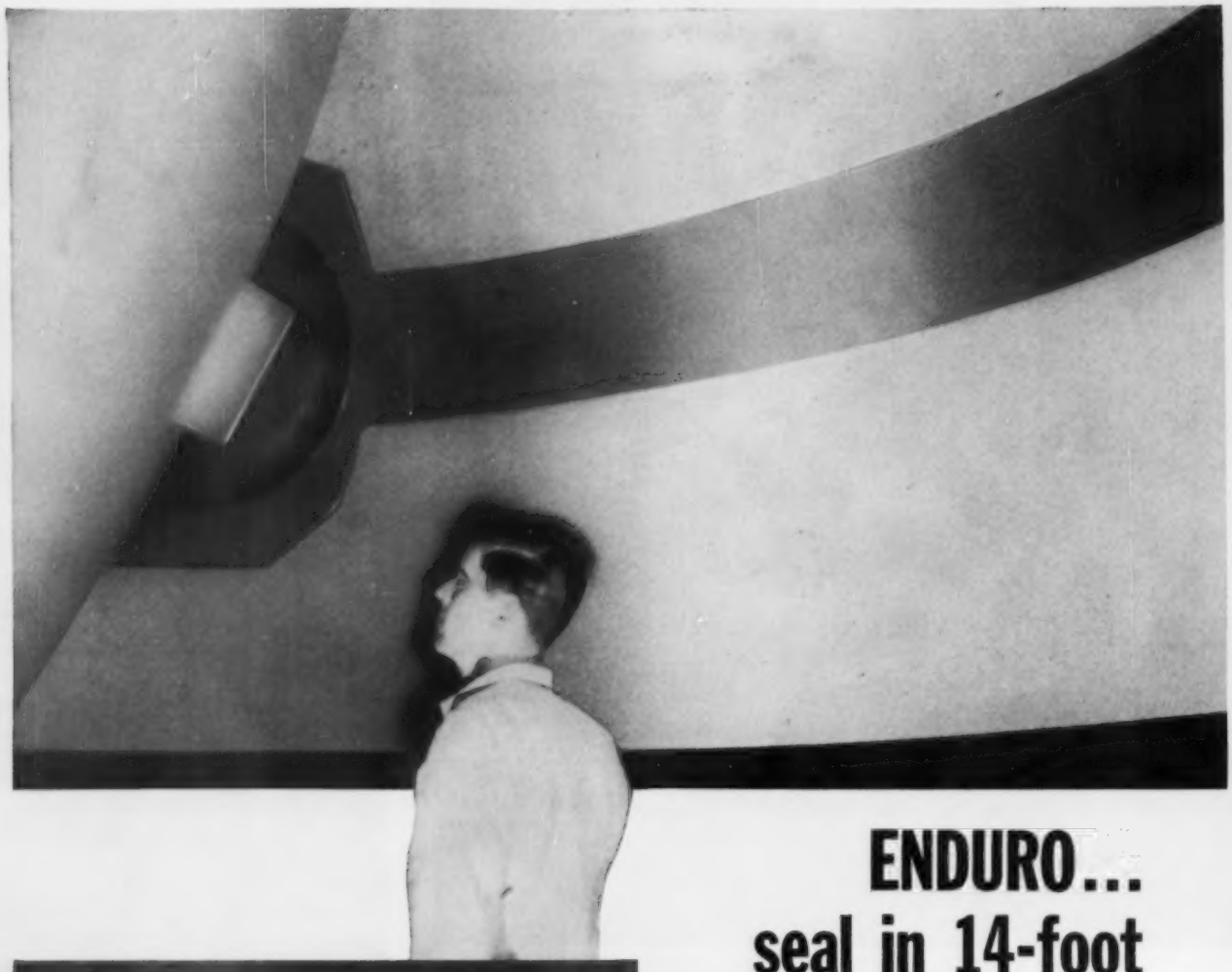
Allmetal Screw Products Company, Inc. • American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Company • The Eagle Lock Company • Elco Tool and Screw Corporation • Great Lakes Screw Corporation • The H. M. Harper Co. • The Lamson & Sessions Company National Lock Company • The National Screw & Manufacturing Co. • Parker-Kalon Div. General American Transportation Corporation • Pheoll Manufacturing Company Rockford Screw Products Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hardware Manufacturing Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

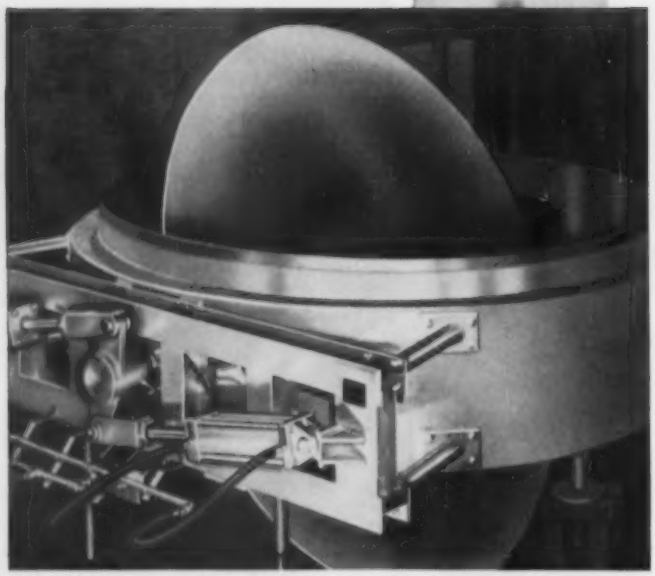
MANUFACTURERS OF PHILLIPS CROSS-RECESSED-HEAD SCREWS

THE FASTENERS OF TODAY ... AND OF THE FUTURE

X marks the spot

... the mark of extra quality





Completed valve is ready for shipment to an Air Force wind tunnel. ENDURO Stainless Steel is used for the seal band which is welded to the inside of the valve body. The manufacturer, Henry Pratt Company, Chicago, also makes a chemical valve fabricated entirely from ENDURO to resist corrosion.

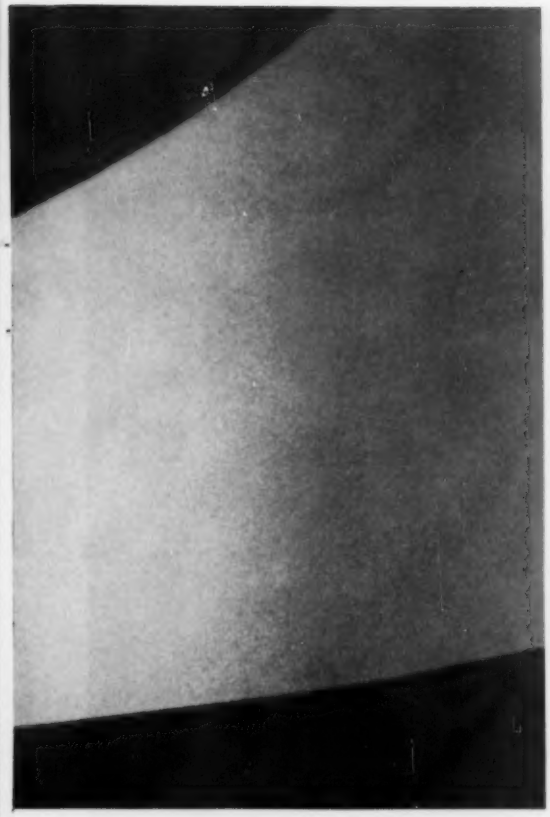
ENDURO... seal in 14-foot

This stressed-seal butterfly valve was made by the Henry Pratt Company, Chicago, for an Air Force wind tunnel. The valve employs an inflatable metal seal band which "inflates" against the disc edge and provides a tight shutoff when pressure is applied. It was designed for operation under static pressure conditions ranging from 0.5 to 50 psia and a temperature range from −10°F. to +250°F.

To meet these operating conditions and to combat corrosion, ENDURO Stainless Steel, Type 301, is used for the seal band. The company prefers ENDURO because of its workability and machinability. Compared to other materials previously used, machining and welding time were cut to

REPUBLIC

World's Widest Range of Standard



provides positive butterfly valve

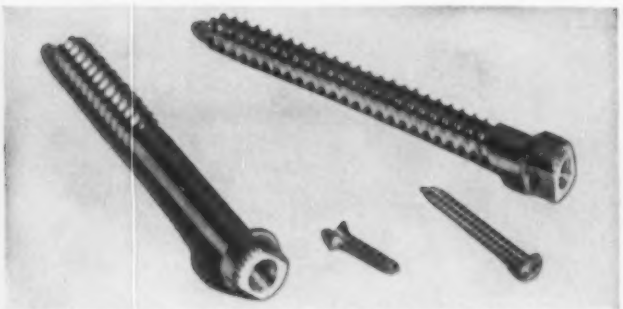
less than half.

Ease of fabrication and stubborn resistance to heat, pressure, corrosion and rust are only some of the features of ENDURO. It provides strength without prohibitive weight and bulk. It's easy to clean. ENDURO is solid stainless steel with no applied surface to chip, crack or peel. It is tough, strong and durable—resists denting and abrasion.

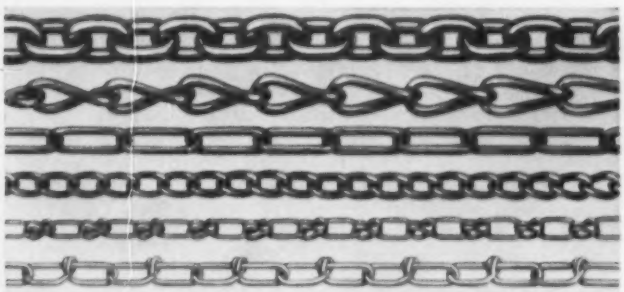
Republic's exclusive "Three-Dimensional Metallurgical Service" is ready to help you apply ENDURO's bonus benefits to your product or process. ENDURO is available through your Republic distributor in many forms—sheets, strip, hot rolled and cold finished bars, wire and tubing.

STEEL

Steels and Steel Products



HERE'S MORE PROOF OF THE MACHINABILITY OF REPUBLIC TITANIUM. These bone screws were made from Republic Titanium Alloy by The Collison Surgical Engineering Co., Baltimore, Md. Machining operations included cutting off, milling, drilling, tapping, threading and buffing. Titanium is used for surgical parts and instruments because it is strong, lightweight and absolutely inert. Republic will help you use all its advantages profitably.



FOR HOISTING, HOLDING, HAULING, TOWING, BUNDLING, you can count on Republic Chain for greatest safety and dependability. Republic's Round Chain Division makes a complete line of welded and weldless chain for every industrial requirement—every type of fitting, attachment and accessory. Strategic location of Republic Chain plants and warehouses assures you of prompt delivery.

YOU CAN SAVE ON TUBULAR PARTS LIKE THESE when Republic does the tube fabricating. Republic's Steel and Tubes Division is equipped to handle all kinds of tough fabricating jobs—has the machinery, the experience and the ability to work out the most economical method of making quality tubular parts. And that includes complete assemblies. Call in Republic to quote when you want to keep fabricating costs down.

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REPUBLIC STEEL

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☐ Fabricated Tubular Parts
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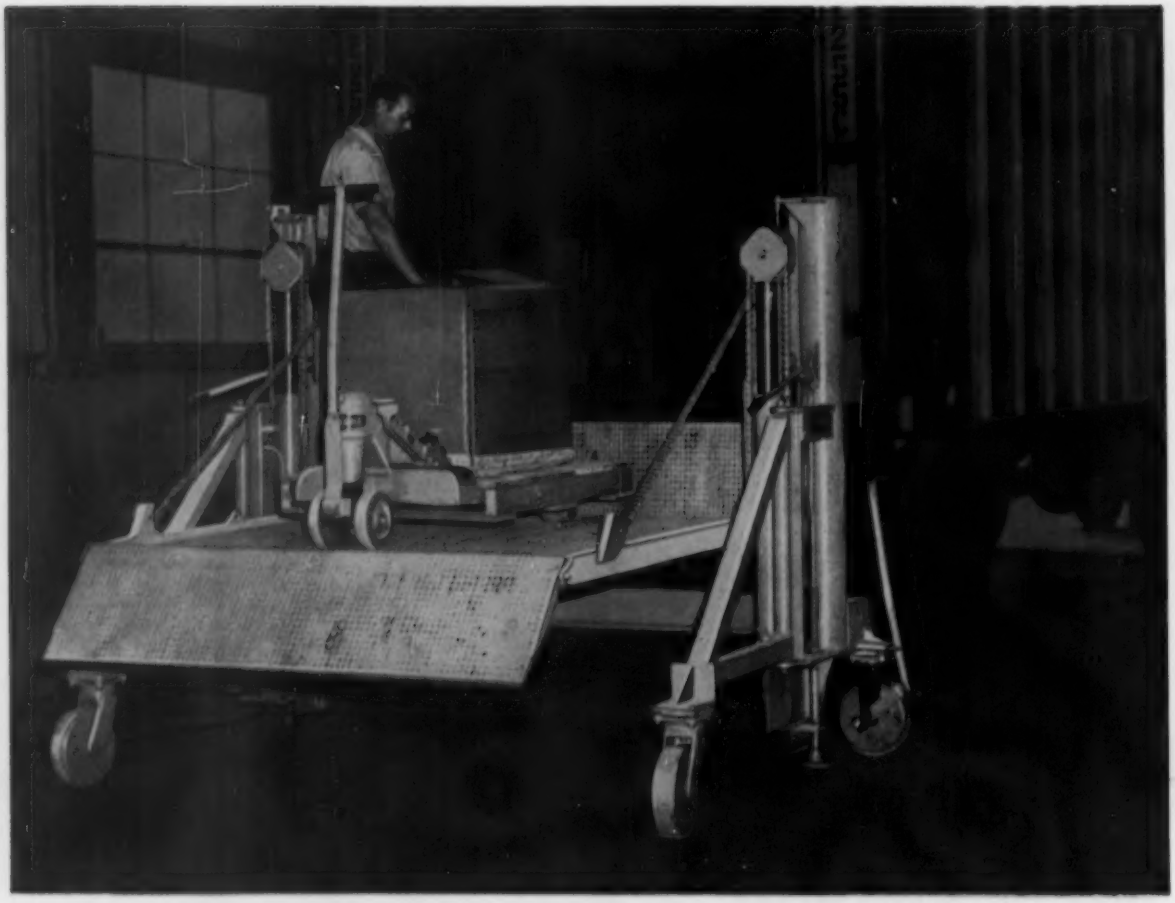

The Porta-Dock, produced by the Raymond Corporation, Greene, New York, can easily load and unload large over-the-road trailer trucks such as this. A remote-control, one-man operated elevating platform, it is used where no loading platform or facilities exist. Easily moved, it can be folded into a compact unit.

Heavy-duty Morse Cable Chains provide the tremendous strength necessary to support the Porta-Dock platform from both sides. Morse Roller Chains run over the sprockets at the top of the rams, to lift the platform. The two rams are synchronized so that the platform is level even when carrying off-center loads.

New portable dock relies on Morse equipment for heavy-duty service

When the Raymond Corporation first designed their new portable elevating platform, they found that Morse equipment ideally suited their power transmission needs. Why? Because Morse Power Transmission equipment is noted for meeting the most difficult requirements, and performing efficiently in every operation.

Morse Power Transmission Products can be depended upon to give the utmost service in this, as in any other application. Designed to meet the rigid requirements of industrial applications, they offer trouble-free service, and freedom from maintenance; reduce machine downtime to a minimum.

Let us show you how the complete line of Morse Power Transmission Products can help you. There are 24 precision-built products to serve you, with a wide range of sizes and types. In addition, we have expert application engineers available to work with you on your power transmission needs. Write today: MORSE CHAIN COMPANY, INDUSTRIAL SALES DEPT., ITHACA, NEW YORK.

MORSE

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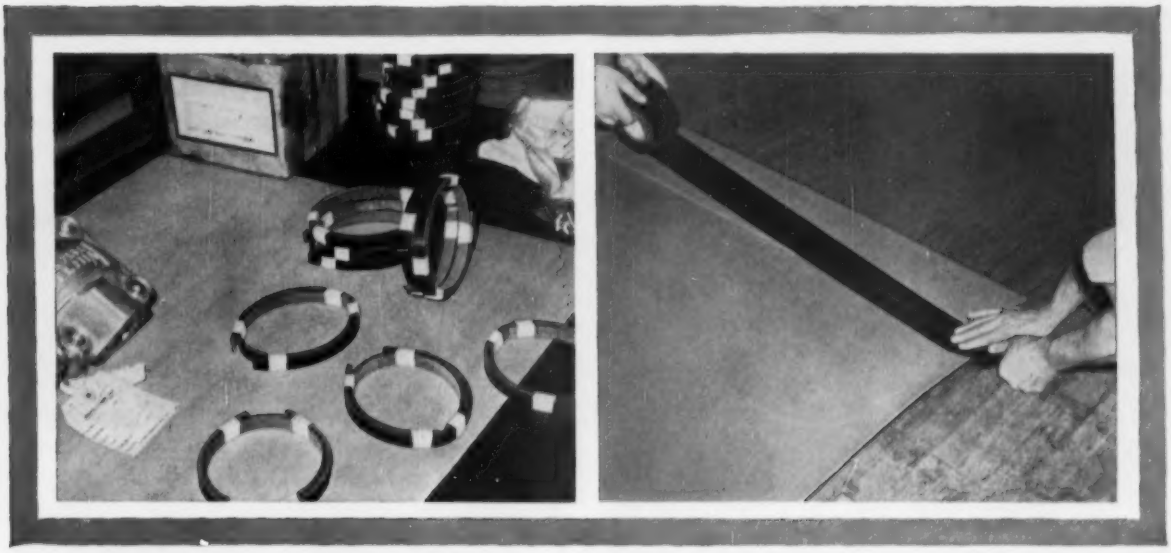
CHAINS, CLUTCHES, AND COUPLINGS

Polyken TAPES

CONTROLLED STRENGTH

KEEP RINGS IN SHAPE, PADDING IN PLACE



These compact coils in the left-hand picture are hydraulic cylinder packing rings. If you took off the strips of *Polyken* Tape that hold them, they'd tend to straighten out. That would make them hard to handle and they'd take a lot more shipping and storage space too.

The other picture shows *Polyken* Tape at work on a different kind of holding job. There a pad of sponge rubber is being put down as a cushioning underlay for carpeting. The sponge rubber is cut to fill in and follow the shape of the room. *Polyken* Tape holds these pieces together, joins them together with a neat and permanent seam, keeps them from slipping out of place once the carpet has been laid.

The tape requirements for these two jobs are not the same. Neither are the conditions under which they are used. To meet the requirements for specific jobs, *Polyken* Tapes have *controlled strength*—the proper combination of adhesive and backing. You use the *controlled strength* required for your job. It's done right and it's done without waste.

The coupon below will bring you complete information.

Polyken®

INDUSTRIAL TAPES

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222 West Adams St., Chicago 6, Illinois

Please send me physical properties and further information on *Polyken* Controlled Strength Tapes.

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Is there such a thing as...

A PRACTICAL REPLACEMENT PROGRAM?

YES! – and Jones & Lamson can help you develop it

Industry unanimously endorses the idea of planned replacement of capital equipment. Nevertheless, most of America's machine tools are more than 10 years old, sadly inferior to today's profit-producing equipment. The idea is sound — but action is lacking.

Biggest reason for this paradox is financial. Until recently, replacement required a substantial outlay of capital. In many cases, needed capital was lacking; in others, the capital, though available, had many other calls upon it. Unrealistically low depreciation allowances on capital equipment served as an added deterrent to replacement.

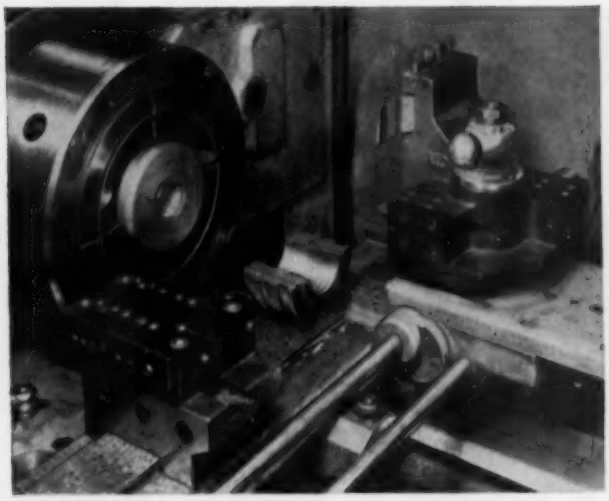
The picture has changed. Now, provisions of our new tax laws permit more equitable write-offs, and make replacement a more attractive proposition.

Jones & Lamson makes replacement even *more* feasible, by clearing away the traditional difficulties of financing with its unique Procurement Plans.

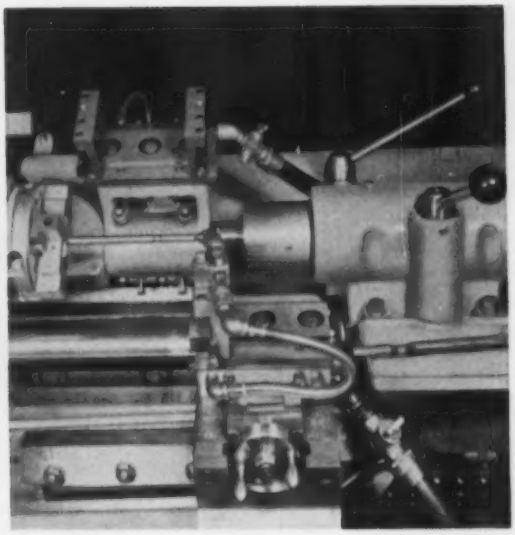
This, then, is what Jones & Lamson offers: modern machine tools that can greatly improve your production; *plus* your choice of several sound, low-cost (interest rates of 3¼% and lower, add-on) methods of procuring these tools.

◀ **OBSOLETE** machine tools like these hamper industrial growth, keep production low, and costs high.

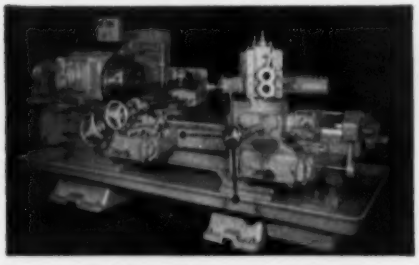
RESEARCH in machining methods, metallurgy, tool geometry, is carried on continually by J & L. Important findings have resulted in the incorporation of unique engineering features in J & L machines.



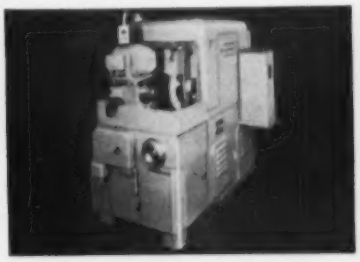
IMPROVED production on this difficult machining job was made possible by J & L engineers' close co-operation with the customer. Research testing, and incorporation of special features on a J & L turret lathe cut time-per-piece on this bottle neck-ring from 14 to 5¼ min., increased production 120%!



AUTOMATIC OPERATION. One Fay Automatic Lathe replaced eight engine lathes formerly used on this job — and substantially increased production of sewing machine crankshafts at the same time.

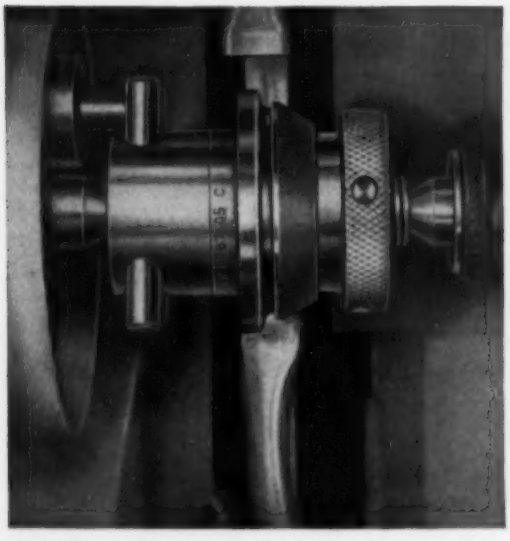


Universal Turret Lathes



Automatic Thread & Form Grinders

Fay Automatic Lathes



GRINDING. This J & L Model "E" Form Grinder, used in producing seaming rolls for the canning industry, completely eliminated a roughing operation, increased production by 100%.

JONES & LAMSON

MACHINE J&L COMPANY

511 Clinton St., Springfield, Vt., U. S. A.

Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread & Form Grinders
Optical Comparators • Automatic Opening Threading Dies & Chasers
Automatic Double-End Milling & Centering Machines

Send today for complete details on J & L's machines, methods and Procurement Plans. Simply fill in the coupon below, clip it to your letterhead *and mail. We'll do the rest.*

JONES & LAMSON MACHINE COMPANY
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GENTLEMEN:

Please send me the J & L Machine Tool Replacement Information Kit.

Name.....

Title.....

Not a "hospital case" in a trainload of AMERICAN PHILLIPS SCREWS

Neither workers nor their work suffer injuries where assembly departments are standardized on American Phillips Screws. For the cross-recessed screwheads don't split or burr . . . the 4-winged drivers don't slip and slash . . . so your skilled workers and costly work-in-process are *safe*. No lost time accidents . . . no rejected products, spoiled materials.

Safety is just one of the reasons why American Phillips Screws *cost less to use*. Easier handling, faster driving, and tighter assemblies with fewer screws . . . these are other American Phillips factors that save 50% over old-fashioned fastening methods. So make it faster *and make it safer* with American.

✕ *marks the spot*
. . . the mark of extra quality

AMERICAN SCREW CO.

PHILLIPS HEADquarters
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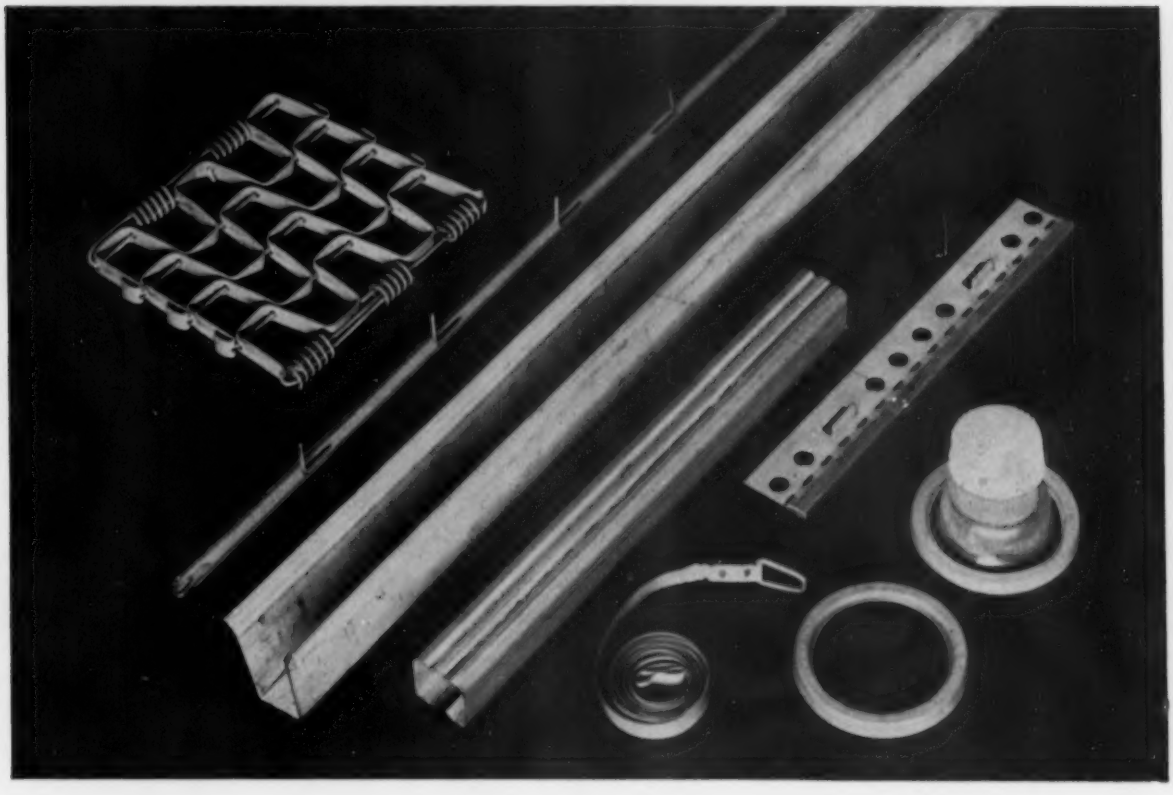
Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

• BRAINARD ELECTRO-GALVANIZED STEEL



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YET REQUIRE NO FINISHING!

Specify Brainard electro-galvanized steel when parts require protection against rust and corrosion . . . you eliminate the coating operation. This pre-coated steel eliminates expensive plating and finishing . . . improves product life and appearance.

The galvanized coating — an integral part of the metal—protects both inside and outside of formed and drawn parts . . . is not affected by forming operations. Coating is hard and uniform, with thickness controlled within .0002.

If your parts require such protection, it will pay you to investigate. Let Brainard quote on your requirements.

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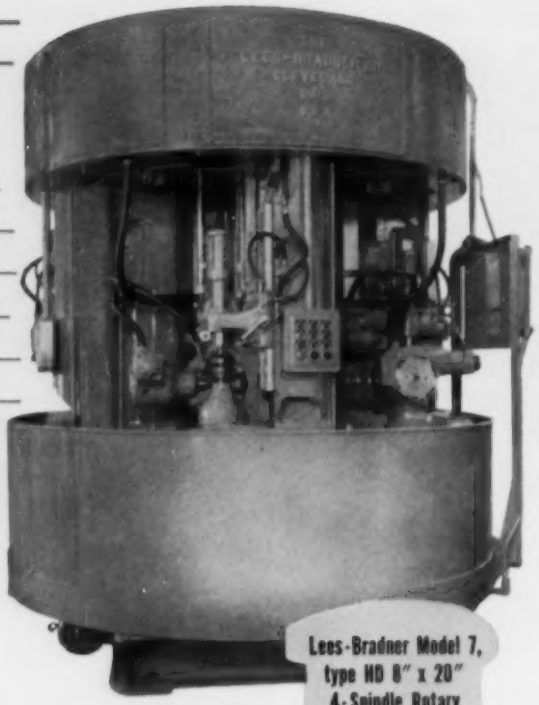
Sets the HOBBING pace for tomorrow

with 4 machines in 1



Lees-Bradner Model 7, type HD 8" x 20" 4-Spindle Rotary Hobber. Also available in single and 6-spindle models.

Here's a complete hobbing production line in one space-saving unit.

Actually the Lees-Bradner Model 7, Type HD 4-Spindle Hobber is four separate and independently operative machines in one. Each hobbing unit incorporates basically the same automatic, high-production features as the remarkable 7 type HD Single Spindle Hobber. This includes a heavier, more rugged headstock, heavy-duty column and a 10 H.P. motor.

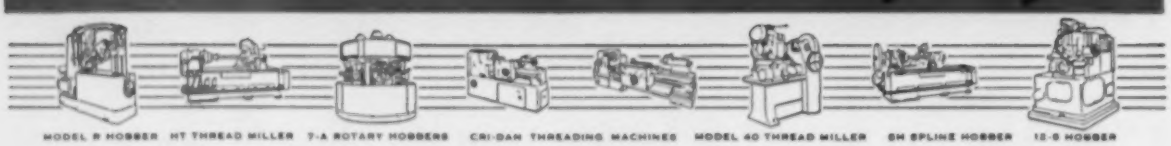
This amazingly efficient machine not only saves valuable floor space but, with its pushbutton controls and automatic features, actually controls the operator thus reducing the chance for human error or slowdown. Chips and coolant are easily carried away from the headstock by the elimination of flat surfaces.

So, if your manufacturing space is valuable and high unit production important, ask your Lees-Bradner representative to give you the story on the ultra-efficient 4-spindle rotary hobber. Write or wire us direct for his name and address in your area.

View of new Type HD headstock with increased bearing surface between column and headstock, heavier casting, coolant and chip carry-away.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



MODEL 9 HOBBER · HT THREAD MILLER · 7-A ROTARY HOBBERS · CRI-DAN THREADING MACHINES · MODEL 40 THREAD MILLER · 8M SPLINE HOBBER · 12-S HOBBER

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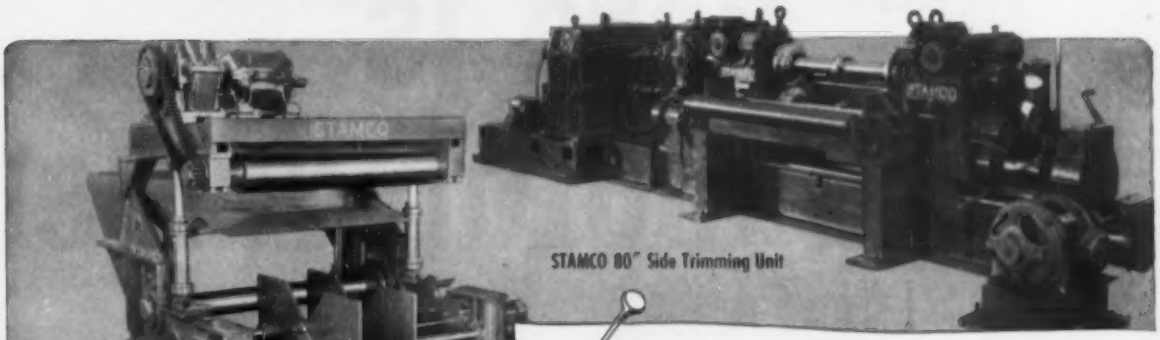
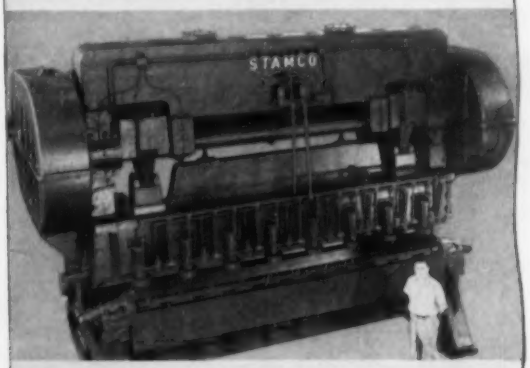
For Special Operations in Steel Mills...



STAMCO 80" Side Trimming Unit

STAMCO Coil Box, coil opener and feeding unit



STAMCO 1¼" x 180" plate shear

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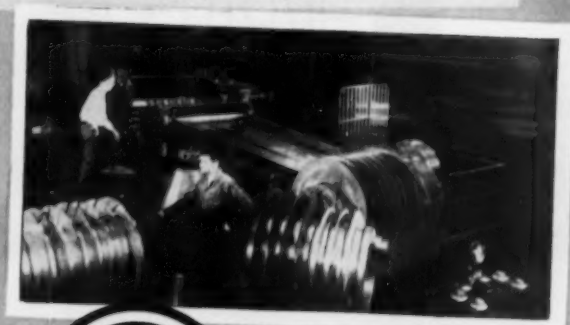
Stamco

for the equipment you need

For mill or warehouse use on ferrous or non-ferrous material, STAMCO has a model or size to fit your needs—or can make it for you. If you use trimming units, plate shears, slitting units, coil openers or any other special steel mill equipment, it will pay you to write us. No obligation.



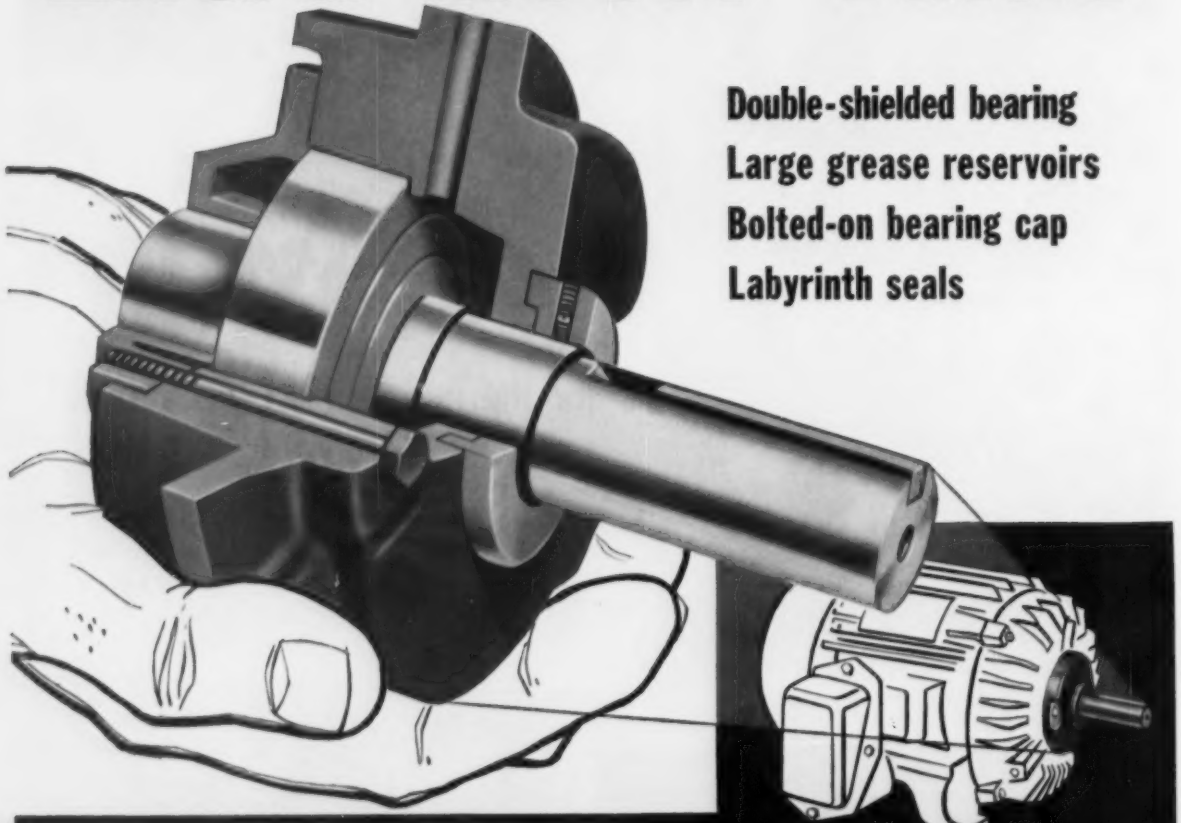
STAMCO 48" Slitting & Coiling Line 15000# coil capacity

STAMCO 72" Heavy Gauge Side Trimming and Slitting Unit equipped with a double set of feed and delivery pinch rolls.

• LAY YOUR SHEARING PROBLEMS AT STAMCO'S DOOR •

STAMCO, Inc., New Bremen, Ohio

Here Is Extra Motor Value



Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and of relieving pressure during re-greasing.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4616

ALLIS-CHALMERS

The Iron Age Newsfront

Sales Delay Model Changeover

One of the big three auto producers has deferred its new model changeover by one month. The reason: Sales of 1955 models are so good it can't afford to lose production. Changeover shutdown originally scheduled for September will be postponed to early October.

Ultrasonic Tempering Increases Die Life

An ultrasonic method for tempering heat treated parts such as cold heading dies now being tested is said to yield good results. Method is claimed to relieve high hardness stresses without reducing actual hardness. Die life in some cases is reported four to five times longer.

Favored for Power

The two types of nuclear reactors power companies believe will offer first real competition to conventional fuel plants are the tube-type, graphite-moderated, water-cooled reactor and the tank-type, light-water-moderated reactor.

Congress to Continue Merger Probes

Look for continued Congressional probes of business mergers despite some easing of the trend to consolidate. The issue has apparently caught the public fancy and Congress will milk it all it can.

Gray Market Steels Show Up

Though not confirmed yet in sales, midwestern plate buyers have been offered gray market plate at $1-3 over warehouse price in the past week. Same price was offered on sheet. These offers were made despite good warehouse inventories.

Patent New Cold Welding Process

A process for cold welding ferrous, nonferrous, and combinations of ferrous and nonferrous materials has recently been patented by a New England firm. Process involves pressing the metals together and then sintering at recrystallization temperatures.

Test Molybdenum Turbine Buckets

Two big jet engine manufacturers are testing molybdenum turbine buckets at temperatures several hundred degrees higher than present materials permit. Work is based on improved coatings to protect molybdenum from oxidation at high temperatures and on improved alloys for higher temperatures.

Microfilming Saves Storage Space

Ford Motor Co. is microfilming all engineering drawings as soon as they are accepted. The company now has 10 million 70mm and 3 million 35mm film negatives stored outside the Rouge plant. Savings in storage space, safety of its records and ability to provide ready reference are some of the benefits achieved from the system so far.

Export Scrap Down the Mississippi

Putting a further drain on scrap in the Chicago area, already losing some marginal scrap source areas to eastern markets, will be growing barge traffic of export scrap down the Mississippi River. This development, watched for several weeks, is now being regarded with enthusiasm by some scrap generators. More are getting ready to make the jump.

Use Magnesium for Jig Castings

To improve maneuverability and save machining expense, a vendor producing grilles for the automotive industry used 1540 lb of magnesium sand castings for jigs that would require over 6000 lb of cast iron. Savings in machining cost alone for nine jigs built is estimated to be $600.

How Nitrogen Affects Oxygen Steel

One little talked about aspect in oxygen steelmaking is the extremely critical amount of nitrogen content in the oxygen stream. If the oxygen is not at least 99.9 pct pure, the steel will pick up nitrogen causing lower physical properties of the steel.

When you're offered oils "just as good" as Gargoyle D.T.E., remember these facts...

Have you ever wondered why, so very often, you're urged to buy an oil that's "just as good as Gargoyle D.T.E."? The reason is simple...Industry has always accepted Gargoyle D.T.E. hydraulic oils as the *standard of quality* in this field!

These substitutes may have *some* of Gargoyle D.T.E.'s properties—but *none* measures up in all-round performance! Gargoyle D.T.E. hydraulic oils last longer—have given excellent service, in many cases, for thousands of hours! They boost machine efficiency—improve production and quality—help reduce manufacturing costs. That's why—although Gargoyle D.T.E. costs a trifle more (often as little as *one mill* per machine per hour) they actually save you money in the long run!

And here's an *extra* plus . . . the world's greatest lubrication engineering service goes with these famous oils—*at no extra cost!* So why settle for less than the best? Call us today!

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Correct Lubrication

FIRST STEP IN CUTTING COSTS

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

NEWS SECTION SPECIAL REPORT

BUSINESS: Will Be Solid Through '56

Business upturn has been better than expected . . . Man on the street regains confidence; buys more; saves less . . . Defense spending moving up . . . Higher wages and prices in the cards—By *Tom Campbell.*

◆ GENERAL BUSINESS, and the metalworking industry in particular, will continue its strong comeback which started in 1954. And even better than that: you can expect the general industrial picture to continue good-to-excellent through 1955 and 1956.

Using the Federal Reserve Board Index (1947-1949 Average = 100), business reached a low point of 123 in 1954. Its previous high in 1953 had been 137. For February '55 the FRB index had climbed to 133. In March it will probably go to 135 and before summer it will reach its previous peak of 137. Business has been much stronger than most executives have believed because:

(1) PESSIMISM — Most industrialists were conditioned to look for worse prospects in 1954 than turned up. Because these gloomy expectations did not come true they unconsciously became more optimistic in their outlook for 1955: especially for the last half of this year.

(2) RECOVERY — Basic recovery has been under way since April 1954. It has moved forward regardless of predictions, pessimism or optimism. It is still moving forward and has not by any means run its course.

(3) THE MAN ON THE STREET—Business has been supported by confidence at the lower and intermediate level. It is mass consumption that keeps things humming and has a direct bearing on capital goods expenditures and industrial expansion. Items:

(a) The man on the street was affected slightly by business pessimism in 1954. He was making out pretty well but he saved a little more and spent a little less. Multiplied by millions this had its effect on appliance sales, on car sales, on retail sales and on general spending.

(b) In late 1954, introduction of new automobiles was a catalytic agent which brought out the current explosive buying rate. Workers and the intermediate class are now spending the money or using the credit which was not spent or used in 1954 in addition to what they could normally have been expected to spend in '55. Now there is complete confidence among workers that there is no particular economic trouble ahead.

(4) DEFENSE—Defense spending has been on the upgrade since July 1954. Superimposed on the general recovery picture it produces a profound effect which is further enhanced by the certainty that:

(a) We're going to have to step

Editor Tom Campbell

- **What about the general level of business?**
- **What's going to happen to the metalworking industry in the second half of this year?**
- **What does the future hold?**
- **And what should you do about it businesswise?**

▪ These are some of the questions set up and knocked down with answers by Editor Tom Campbell after a detailed study of the economy.

▪ It is a follow-up on the predictions that he made November 18. Most of them are rapidly coming true.

up our defense and military aid to all of our allies—especially in Europe and in Asia, and do it quickly. This is a certainty. Don't forget it.

(b) Our so-called "new look" is now going through the wringer. It may cost more than expected because of the increased costs of new type defenses.

(c) Rearmament of Germany is having its psychological effect on West Germany, France, England and the U. S. The project will not be completed before the next 3 years or more but this period will be a most sensitive one in our relationship with Russia. The free world will push rearmament of Germany; Russia will do everything it can to stop it. Either way the domestic picture will be souped up.

(d) We are not prepared for a serious war in Asia but we are close to it. Even if we're not going to have it we have to be prepared for it. The stock market, the purchasing agents and business trends recognize this better than the average person.

Talk about an industrial decline this summer is academic. It isn't going to happen. Here are some additional reasons why the business horizon looks good up to 1957:

(1) POLITICS — The Republican Party is a minority party. If it is to be political at all—and all parties are—it must consolidate and tie itself in some way with continued prosperity and with an identification to the man on the street. This means everything possible will be done to stimulate business, especially in 1956.

(2) WAGE ROUNDS — This year will see another series of wage increases in basic industries. Automotive workers will receive some kind of an inflated or liberal unemployment plan which with a little stretch of the imagination could be called a guaranteed annual wage—or else they will get a commitment that they will get it after details are worked out. Steelworkers will get about 10¢ an hour increase. This will set a pattern for other industries. Trends from the aircraft and other industries have already indicated that a new inflationary wage cycle has started.

(3) PRICES — Material prices are going up again in 1955. Led by steel and then by products made from steel, this action is necessary in order to pay for the wage increase and to protect stockholders' equity. Few buyers will be able to hedge. These price increases will force more automation, more business machinery installations, expansion in machine tool sales and a speedier replacement of obsolete machines and equipment.

(4) COLD WAR—There is little chance of the Cold War ending soon. We are entering a period where there can be no more cutting of the defense budget and where we must back up our foreign policy with the military power to carry it out if necessary.

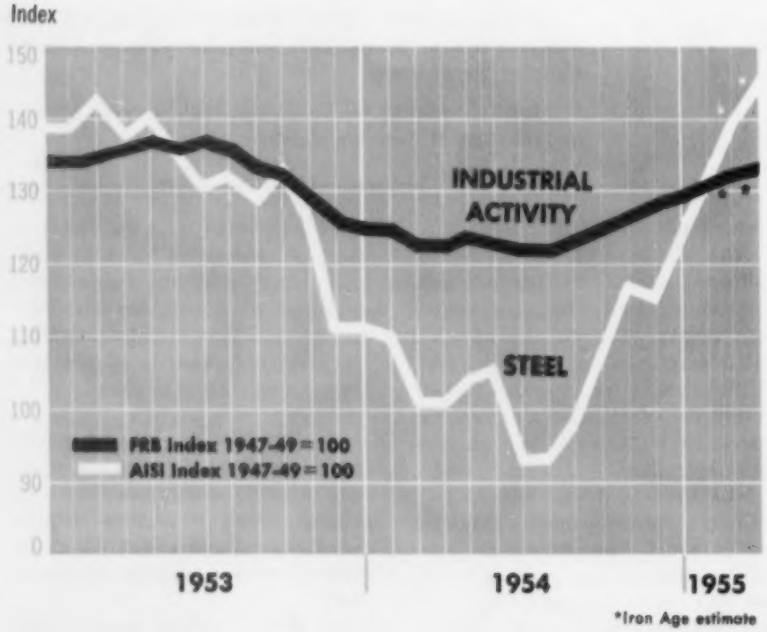
(5) GROWING ECONOMY—Some observers have overlooked the fact that we are in a dynamic growing economy—one that will support both butter and guns. The tremendous increase in births and the substantial increase in family units yet to come stagger the imagination.

It is clear that a business cannot stand still. It either goes ahead or moves backwards. It is also clear that no plant or firm can compete today with old tools and equipment. Top management also has to know and be able to interpret what's happening here and abroad in terms of its own business. Business is not being done today the way it was in the Twenties, in the Thirties or even in the early Forties. Here are a few suggestions:

(1) For the next many months try to build your inventories. The price cycle is such that you are not out money if it is invested in stocks of material you know will be needed. Level out your peaks and valleys.

(2) Take a second look at your appropriations for advertising, promotion, research and new products with a view toward expanding them. If you don't do this you may end up standing still—which means moving backwards.

Steel Big Factor in Recovery



As a Businessman, Here's What You Should Do:

* Build your inventories. Investing in materials you know will be needed is good business in view of price cycle.

* Expand your appropriations for promotion, research, new products, and advertising.

* Plan on the assumption Cold War is here to stay. Be prepared to handle defense contracts.

* Recognize the power of Labor and plan your collective bargaining techniques accordingly. Remember that the business picture is working in Labor's favor but you can offset some of its demands with some of your own.

* Be flexible in mind, plant, and imagination.

* Take a good look at your management team. Is it up to par? Do your people know the meaning of real competition? A real appraisal now will pay dividends later.

(3) Assume that the Cold War is here to stay and plan your business accordingly. Always be in a position to fulfill promptly and qualitatively any defense job offered you.

(4) Recognize that labor has a tremendous power behind it and revise your bargaining techniques accordingly. Plan your demands in order to offset some of labor's demands. Labor has the business picture in its favor and skilled and knowledgeable labor is a short commodity.

(5) Don't hold to old ideas, personal viewpoints, idiosyncracies in the face of new and important business and international facts or trends. In other words, be flexible in mind, in plant and in imagination.

(6) Remember that your competition may be from the outside or from within. Your people must have mental reach and seasoning in management techniques which have changed so much. Your people must have experience in the competition of business. If they don't, you had better give this some thought in looking ahead to the next 5 years or more. You will be well paid.

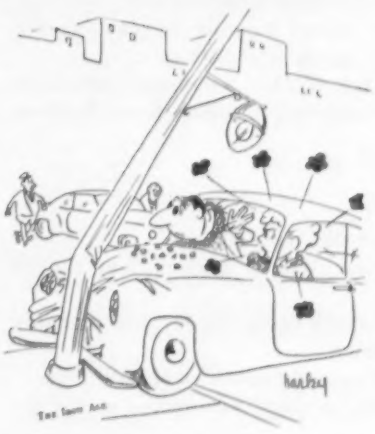
Jobs:

Factory employment leads broad March increase.

Overall job picture continued to improve in March, spurred by the biggest gain for the month in factory employment in years.

Unemployment fell 207,000 from February, reaching 3,176,000, which is well under the 1954 high recorded early last year. Employment at the same time jumped 539,000 to a total of 60.4 million. The increase in employment exceeded the decline in unemployment because a number of farm women and young persons joined the labor force, the Labor and Commerce Depts. note in announcing the figures.

Factory employment rose by 160,000, reaching 16.3 million, slightly above the level of a year ago, but well below the record high for the month registered in 1953.



"George, look what you've done to our new windshield!"

Every manufacturing industry except ordnance and tobacco reported employment increases, with the biggest gains coming in durable goods, primary and fabricated metals, and automobiles.

Pay Hits High

A lengthening factory workweek indicated the renewed strength of the job picture. At 40.7 hours, the March workweek was 1.02 hours higher than a year ago and at its highest point since mid-1953.

Weekly earnings of factory production workers also hit another new high of $75.30, some 96¢ above the previous record set in February and $4.59 above a year ago.

Despite the rise in over-all employment, non-farm jobs showed a slight decline of 69,000, but still were some 560,000 above a year ago. The dip stemmed partly from a shift of non-farm workers back to the farms as the weather improved.

Steel:

Steel employment and wages rise as boom continues.

Employment in iron and steel continues to rise. American Iron and Steel Institute reports steel employment in February was 616,400, a rise of 11,300 from January.

Whether employment will again reach the record 696,000 of mid-1953 is questionable. Steel producers are stressing mechanization and automation. New and more efficient facilities enable the mills to produce more per man-hour worked.

Hourly payroll cost of wage earners in February was $2.406, a new high. Figure in January was $2.387. Average hourly employment cost in February, including pensions, social security, and insurance, was $2.585, compared with $2.566 in January.

Wage earners worked an average of 40 hours a week during February, compared with 37.8 hrs during January. Total payroll cost of wage and salaried workers was $255.1 million in February, compared with 258.8 in January, a longer month.

UNIONS: After GAW, A Shorter Workweek

Steelworkers and autoworkers have their sights set on a short workweek . . . It would mean increases in labor costs up to 20 pct . . . Strides in modernization, increases in labor force, prompt action.

◆ INDUSTRY can brace itself for a short workweek demand from its labor unions when and if the smoke and fire of the guaranteed annual wage battle clears away.

Without conceding that labor will necessarily win all or any part of a real GAW package this year, it is apparent that a shorter workweek is next on the agenda of labor's schedule of advancement.

Reuther on Record

In fact, there are some labor leaders, even though they may be a minority faction, who place the shorter workweek ahead of the GAW. AFL trade unions for years have moved in that direction in some industries.

Walter Reuther's most vocal rival in the United Auto Workers, Carl Stellato, head of the giant Ford Local 600, is an ardent short workweek advocate. In the UAW's bargaining committee recommendations this year, a paragraph or two stating approval of short workweek principles was considered a nod to the Stellato faction.

In Washington last week, Mr. Reuther himself stated that after the GAW, the auto workers will go after a shorter workweek.

The United Steelworkers, through I. W. Abel, union secretary-treasurer, earlier this year indicated the short week was within the union's vision.

On a Canadian visit (THE IRON AGE, Feb. 24, 1955, p. 42) Mr. Abel said the best way to maintain employment in the steel industry is through a reduction of the workweek. He tied in this concept with the growing mechanization of the steel mills.

"If methods of production improve, the only solution would appear to be a reduction of the week to a little more than 30 hours, say a 5-day week with 6½ hours in each shift.

"That would maintain employment, and it is a plan I hope to see linked with our demands for the guaranteed annual wage."

Increase Labor Cost

The steelworkers contract expires June 30, but negotiations are confined to wages and hours. This leaves the UAW the job of carrying the GAW ball this year, a situation which appears to be satisfactory to the USW.

A 32-hour week would mean at least a 20 pct increase in the basic labor costs, with cost of supervision forced to climb proportionately. With larger payrolls, industry would be forced to pay more in fringe benefits and pensions. Obviously, any such climb in labor costs would have to be met with increased prices and result in a serious inflationary threat.

Meanwhile, Ford and GM are in the first stages of negotiations on UAW demands, with both sides apparently agreed on private meetings. GM in particular is determined to keep negotiations between the bargaining committees private, a procedure that has resulted in successful negotiations in the past. Any leaks would probably originate with the union, but only if things appear to be going unsatisfactorily.

In Washington, Mr. Reuther radiated confidence and restated his belief that the first breach in

GAW—Good or Bad?

Proponents of the guaranteed annual wage claim it would:

1. **Minimize unemployment by smoothing out peaks and valleys in demand and production.**
2. **Insure worker purchasing power in slack times.**
3. **With an assured income, workers would be able to plan for the future and space their buying of goods and services.**
4. **Encourage management to look for further ways and means to eliminate fluctuations in production either through diversification or better market planning.**

Opponents of GAW say:

1. **A man should not receive pay for not working.**
2. **Labor should not be made a fixed cost of business but should vary according to production.**
3. **The job would be done better and more equitably through changes in unemployment compensation laws.**
4. **GAW would restrain full production and reduce available jobs.**
5. **Stronger companies would benefit; weaker companies would be weakened still further.**
6. **It would increase costs, which would be passed on to the consumer in the form of higher prices.**

industry opposition to the GAW will be made in the auto ranks.

He thinks there is historical support for believing management will give in on the GAW. He cited industry opposition to pension programs which eventually have been made to work. Industry, he asserts, can find a workable solution to the problems of guaranteed annual employment.

UAW Confident

He says he is worried about increasing joblessness and insists there will be more unemployment at the end of 1955 than there was this January.

In a sideline, he also hints that the possible new name of the combined CIO-AFL amalgamation may be the United Labor Movement. When this union is completed, but not before, he says the United Mine Workers and other independent groups may join the movement.

Wage Fixing Out

Administratively set nationwide minimum wages for firms working on government contracts are illegal, a Federal district court rules in a decision which will be appealed by the U. S. Labor Dept.

The court makes it plain to Labor Secretary Mitchell that his department does not have authority to set a single pay floor in an industry, but must establish minimums on a locality basis only. Ruling came in an appeal by 158 cotton and rayon manufacturers.

At present, there are 41 other minimum wage orders outstanding, of which all but three call for industry-wide pay floors. It is understood, however, that the recent ruling affects only the single case, except as it may become a precedent when other industries protest nationwide minimum wage laws set under the Walsh-Healey public contracts act. The act permits the government to set minimum wages which government contractors may pay.

The court notes that there might be some valid arguments in favor of national minimums, but says it is up to Congress to change the law to permit this if it wants to.

MARKETING

Wire: Orders Mount

Consumers face tightest market in years . . . All basic products tight . . . Manufacturers tightest . . . Seasonal boom now approaching peak—*By T. M. Rohan.*

◆ WIRE CONSUMERS are bucking one of the toughest markets in years. The scramble for manufacturers, merchant, and construction wire products is building up to a high pitch. And the end is nowhere in sight.

Producers believe there is enough momentum to carry through the year.

Wire customers in hotly competitive fields are shopping from mill to mill trying to get better delivery dates. Most are having a tough time. Many are taking delivery from mills miles from their normal sources and paying up to 2 pct premium in freight.

Of the three major products, manufacturers is showing the strongest upsurge, merchants wire is gathering seasonal steam and welded wire fabric output is at capacity, is likely to stay there through third quarter. With a good fourth quarter, welded wire fabric production would set a new record.

Some Hedge Buying

In the auto, appliance, fastener, and allied fields, manufacturers are struggling to keep pace and still build up an adequate inventory. Wire deliveries are extended. In January, deliveries were only 2-3 weeks; now they are out to 12-14 weeks. Spring steel deliveries are out to July.

Steel producers admit there's probably some "water" in their order books due to hedge buying. The hedging comes principally from customers protecting themselves delivery-wise.

Low-priced imports are no problem this year. Most foreign suppliers who normally export to the U. S. are barely able to supply their own customers. About half of all wire imports last year were merchant wire.

RED HOT rod is coiled at rate of 3300 ft a minute in American Steel and Wire plant.

The full scope of farm industry buying of merchant wire is still uncertain. Producers see a few straws in the wind, however. Although they expect overall farm income to be about 1.25 pct below last year, they think the farmer will spend more. Last year the farmer's outlook was dour, but this year he is much more optimistic, and will probably buy more.

Many merchant wire distributors were caught short last year and indications are it will happen again this year. Producers can cram only so much bulky wire into warehouses. Because of this, distributors have been urged for years to get their orders in early, with negligible success. Last year, despite the inventory readjustment, there were heavy orders for rush shipment direct to distributors' customers during the April-June seasonal peak.

NICKEL: Shortage Won't Ease Soon

Tough period ahead for civilian consumers . . . Alloy and stainless producers running short on inventory . . . Electroplaters forced to pay premium prices . . . Consumers turn to substitutes—By W. G. Brookfield.

◆ NEXT 3 to 6 months will be critical for civilian consumers of nickel and nickel-bearing steels.

It's an old story: Heavy civilian demand, superimposed on defense and stockpile requirements, is spreading the available supply thinner.

Government release of 3 million lb of nickel which had been earmarked for the stockpile during the second quarter will be of little help to civilian users. Business & Defense Services Administration says nickel supply for non-defense use in April will be less than in March despite the stockpile diversion. The reason: An increase in defense orders for nickel-bearing steels in April.

Uncertainty of nickel supply poses a problem for producers of stainless and alloy steels. Some are deferring acceptance of third quarter orders until they have a better idea of how much nickel will be available. They're now living off rapidly-dwindling inventories built up during last year's slump, plus what they can obtain currently from suppliers. But consumption is running far ahead of receipts.

Mills Are Worried

Electroplaters are also in bad straits. Small operators, particularly, complain they are being short-changed. Some have been forced to buy from "outside" sources at premium prices. In a few cases, their prices to automotive customers have been adjusted upward to compensate for higher production costs.

Steel producers are worried over whether present production schedules on alloy and stainless can be maintained through second quarter. At least one mill has placed customers on allocation.

Russell M. Allen, vice president-sales, Allegheny Ludlum Steel Corp., describes the situation this way:

"Last year, as a result of a dip in the rate of steel operations, most steel mills found it possible to accumulate some inventories of nickel. With the present operating rate, however, these inventories are rapidly being depleted, and it appears that by the middle of the year there will be insufficient nickel available for the needs of industry."

This appraisal is based on: (1) no cuts in military nickel consumption; (2) no decrease in present consumption by industry, and (3) no increase in the rate of nickel allocation.

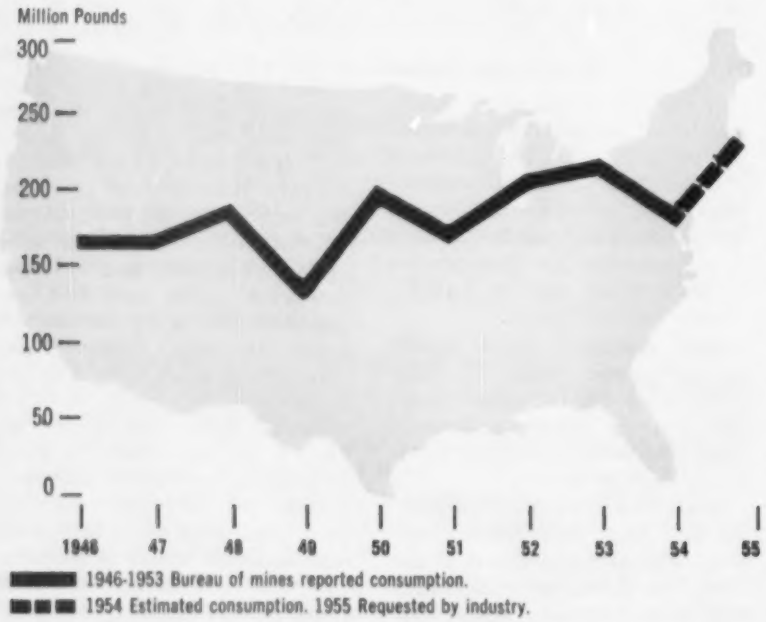
Turn to Substitutes

A Commerce Dept. survey released recently (THE IRON AGE, March 10, 1955, p 56), estimated 1955 nickel requirements for defense and civilian uses at 225-230 million lb as against 200 million lb expected to be available. But since the study was made, civilian and defense needs have accelerated, so the indicated deficiency for this year might be greater than government planners expected.

Some sources look for civilian demand to ease in third quarter, but the current economic upsurge has fooled so many forecasters that few users are willing to take the predictions at face value.

Meanwhile, the mills are urging their stainless customers to swing over to the chrome-manganese grades, which contain only relatively small quantities of nickel.

U. S. Nickel Consumption Rising



SCRAP: Briquettes for Openhearths

Dealers form briquettes for openhearths . . . High density a big advantage . . . Need analysis for uniformity of turnings . . . Pittsburgh Steel first big user.

◆ SCRAP in a new form for openhearth consumption is in the development stage in Pittsburgh. Briquettes formed from steel turnings are now being produced and used in openhearth charges on a limited basis.

While still in the early stage, future use could easily mount to large proportions when some of the present obstacles are overcome.

Briquettes are not new to the industry by any means. However, their chief application in the past has been in the country's foundries. Scrap dealers in the Midwest have been producing briquettes from cast iron borings for some time for foundry use. Many automotive and several other large manufacturing companies have been making them for their own foundries.

BRIQUETTES are charged into openhearth furnace at Pittsburgh Steel Co. plant in Monessen, Pa.

Some Skepticism

Today there are two scrap dealers who are turning out briquettes specifically for openhearth uses. They are Pennsteel Corp. and the Plainfield Iron and Metal Co. Their combined capacity at present is less than 5000 tons per month.

Many mills are still viewing the operation with skepticism. The main obstacle in the path of acceptance is the control of analysis in the briquette. There are few, if any, scrap dealers with anything in the way of testing equipment and the majority of turnings shipped to dealers are in heterogeneous lots. As a result, few carloads are suitable for briquetting for openhearth use.

To overcome this handicap, the Pennsteel Corp. in Pittsburgh has endeavored to obtain carloads of turnings which are of uniform analysis. Samples of these cars are taken and sent to a testing laboratory for further analysis. Then, those cars which are reported low in residual content are used for briquettes.

Samuel Goldberg, president of Pennsteel, is first to recognize the difficulties which must be overcome to gain wider acceptance of the product. However, he believes the market will develop in the near future.

Offer Advantages

While the company has one briquetter operating at present, another is assembled and is soon to go into operation. Future plans also call for the installation of one of the new direct reading spectrometers. This will not only enable faster analysis of the turnings, but also permit a more thorough analysis of each car.

Briquettes offer several advantages over much of the scrap now being used in openhearths. They have a density of 75 to 80 pct which is higher than most of the scrap used. This not only results in better recovery from the scrap, but in addition, speeds up charging operations and substantially lowers other handling time.

Manufacture of briquettes involves two separate crushing operations plus compression by a 350-ton press. The present press at Pennsteel produces 14 briquettes a minute with each briquette weighing approximately 10 lb. During compression, over 50 pct of the oil and water is squeezed out of the turnings. The addition of the second press will double production and raise monthly capacity over 3000 tons.

Pittsburgh Steel Co. has used briquettes in its openhearths intermittently for about two years. At present, the company is charging approximately 1000 tons per month. Results compare favorably with No. 1 heavy melting. The company feels that with the development of proper analytical control, future widespread use is certain.

Iron Ore:

Great Lakes shippers eye thick ice, big stocks

The biggest Great Lakes ore shipper was working up a full head of steam for an early start to the season last week but others appeared in no hurry at all.

At a meeting of the ice committee of the Lake Carriers Assn. in Cleveland last week, the U. S. Coast Guard announced it was sending the icebreaker Mackinac into the lower St. Mary's river to start ice breaking operations there. A carferry will also be prepared for use if necessary.

Following the meeting and a personal aerial survey of the upper lakes area, Donald C. Potts, president of U. S. Steel's Pittsburgh Steamship Div., said the division's fleet would get under way April 11 for upper lakes ports. Other shippers are in no hurry.

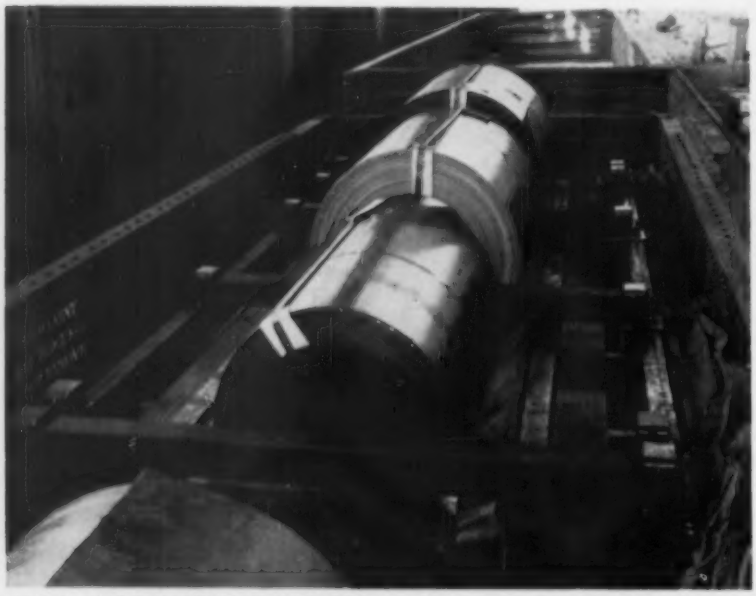
TRANSPORTATION

Coil Cars Cut Shipping Costs

Railroads are coming up with more answers to truck competition in steel hauling. They are making it easier and cheaper to ship steel coils by rail with specially-equipped gondola cars.

Nickel Plate Road is the latest hauler to announce it is equipping cars with special skids that make it possible to handle larger shipments, reduce time and expense in loading and unloading, eliminate need for individual wrapping of the coils, cut out blocking and dunnage charges and minimize damage in shipment.

Nickel Plate estimates savings to shippers amount to $80 per car for blocking and dunnage alone. The shipper also saves the shrouding extra charged by the mills. This extra normally runs $1.00 per ton, but for special protection in bad weather, individual wrapping of coils may be required at a cost of $6 to $9 per ton.



SPECIALLY EQUIPPED Nickel Plate gondola car can handle six 72-in. coils of steel. The new car cuts handling costs and damage.

The railroads have been at a disadvantage with trucks in this respect due to these extra charges. Steel truckers simply place a tarpaulin over their load at no extra cost.

The Nickel Plate skids are installed two to a car, with heavy-duty buffer springs at each end. Cross members separate the coils to prevent damage. The separators also make it possible to use hooks and chains from overhead cranes in handling coils. A tarpaulin protects the steel from rain and dirt during shipment.

The coil cars have a load capacity of 70 tons and each car can handle a half dozen 6 ft coils or a larger number of smaller coils.

Chesapeake & Ohio Railroad has developed a similar car which has a metal top instead of a tarpaulin to protect the coils. Erie Railroad has also come out with similar type cars.

To Buy New Rolling Stock

New government approvals of applications for fast tax write-off benefits add impetus to railroad industry demands for new rolling stock.

Illinois Central R. R. Co., Chicago; Southern Ry. Co., Washington; and Union Pacific R. R. Co., Omaha, now have certificates allowing a major percentage of fast amortization on purchases amounting to more than $29 million.

Illinois Central, buying $11.7 million worth of diesel locomotives, has a certificate permitting 55 pct for fast write-off.

Southern gets an 85 pct allowance on the purchase of freight cars costing $10.3 million.

Union Pacific also gets an 85 pct allowance on its purchase of $7.7 million worth of freight cars.

Present trend of freight car orders is slightly upward, but demand for new locomotives is still slow, the Assn. of American Railroads reveals.

Freight cars on order as of Mar. 1 totaled 18,663 for an increase of 268 over the Feb. 1 total. Deliveries in February numbered 2422, compared with 2008 in January.

Class I railroads had 455 new locomotive units on order on Mar. 1, including 445 diesel-electric and 10 electric units. One year earlier, there were 521 units on order.

Installed during the first two months this year were 221 new locomotives, all diesel-electric. The number placed in service was about the same as in the first two months of 1954.

Agree on Fast Tanker

Newly-signed contracts involving Newport News Shipbuilding and Drydock Co., The Texas Co., and Maritime Administration are to result in construction of a high-speed tanker costing more than $6 million.

Building of the 565-ft vessel is agreed to under the government Trade-In-and-Build program. As part of the arrangement, Maritime Administration accepts for the reserve fleet two tankers owned by the Texas Co.

Capacity of the new vessel will be 153,000 bbl of oil.

IN A COST-CUTTING drive, Westinghouse Corp. is relying on its suppliers. Last week its East Pittsburgh divisions staged a Supplier Day program for 160 supplier representatives. Idea was to give Westinghouse engineers and the firm's suppliers a chance to exchange ideas on costs, manufacturing problems, product improvement. It also gave the suppliers a chance to see exactly how their products are used by Westinghouse.

Inventory:

New system saves time, helps stimulate sales.

◆ A NEW PERPETUAL inventory system that is seldom more than four working hours behind actual transactions is the key to service and savings at Hartford Machine Screw Co.'s Standard Products Div.

Designed to flash a constant alert to division managers on day-by-day and year-by-year sales, the system is built on seven major factors:

Production orders in the plant or recently completed, production coming on each order and total amount due, date production is received, daily amount shipped, accumulated totals for the year to date, total stock in storage, total sales for each of the previous three years.

Cuts Extra Steps

Each item on the inventory form tells a significant story:

The three-year sales record tells the division if a sudden influx of customer buying is due to a single heavy day or is in line with seasonal experience in the past.

Listing of open production and recently-completed orders indicates how often it has been necessary to order from the shop. This points the way to more efficient ordering procedures and eliminates unnecessary set-ups.

Listing production due on each order and the total amount due helps prevent "panic" ordering by showing that on-order quantities may be sufficient to fill sudden large requests.

Dividends to the company since the basic system was set up 10 years ago have been in both dollars and customer satisfaction through speedier service. Proof: two or more orders from the same customer are processed simultaneously, thus reducing handling costs and saving the customer extra shipping charges.

Hartford has been able to build a reputation on the basis of 24-hour shipping service.

Emergency Delivery

The company maintains 2371 stock items, with up to 750,000 pieces of a single item in inventory. Daily shipments average about 500,000 assorted pieces, but as many as one million parts have been shipped by truck, rail, air, or automobile as circumstances require.

MANAGEMENT

Safety:

GE plant program makes workers safer off the job.

◆ GOOD SAFETY programs in industry don't stop at the plant time clock. They continue onto the highway and into the home.

This conclusion is documented conclusively in a study made for General Electric Co. to determine the effect of plant safety education in the community.

And there are strong indications that if workers were supplied with specific ideas on home and traffic safety, the program's effectiveness in the off-the-job hours would be even greater.

The small Ohio city of Coshocton was the testing ground for the study which was made for GE by Group Attitudes Corp. Results showed that GE workers and their families, presumably because of plant safety programs, are safer at home and on the highway than the general public and other workers in the area.

Even considering that Coshocton families in general are more than twice as safe in automobiles as the average American, the study showed that GE families have six times as good a record as other Coshocton families in frequency of auto accidents involving personal injury and have half as many accidents involving property damage.

Hospital figures showed that safety records of GE employees and families are better than the average. However, allowance had to be made for the liberal insurance plan coverage offered by GE. Presumably, this leads GE workers to seek hospitalization with greater frequency than people who are not covered by such plans.

Know the Principles

In the home, accident prevention is seldom discussed or practiced among non-industrial workers. There is some talk about safety in the homes of non-GE employees, but nowhere near so much as in homes of GE people.

Dispersal:

Industry incentive plan under study.

Federal mobilization officials are on the verge of issuing revised suggestions for industry in trying to minimize potential damage from an enemy attack, and is considering ways to make protective plant construction more attractive.

Dr. Arthur S. Flemming, director of the Office of Defense Mobilization, reveals in a talk before the American Industrial Development Council in Washington that new dispersion information, based on results of recent super-bomb tests, have already been worked out. An inter-agency task force is now working on transmitting the data to the Commerce Department's Area Development Division, which will in turn present it to industry and municipalities who ask for help.

May Grant Incentives

The mobilization chief also tells the Council that his office may have authority to grant incentives in addition to the rapid tax amortization certificates in order to make dispersed, bomb resistant plants more attractive to industry to build. He asked for suggestions on what additional incentives are needed, particularly toward getting utilities extended to dispersed areas in order to serve new plant facilities.

Planners, Dr. Flemming says, have abandoned the former rule that new plants must be constructed at least 10 miles from a critical target area. Now, applications are considered on a city-by-city; a state-by-state; or industry-by-industry basis. The government's role, aside from fast tax certificates, is to give information on possible bomb damage to help municipalities develop a dispersal plan, the mobilizer says.

Dr. Flemming will soon call in an advisory group to go over the information on possible bomb damage and the advice that government is giving to industry.

Set Up Titanium Lab

Initial job of a new titanium metallurgical laboratory set up by the Defense Dept. will be to give industry technical advice on production and use of titanium for military equipment.

Battelle Memorial Institute, Columbus, Ohio, will operate the laboratory under military contract. The institute's advisory activities will supplement customer-service work now offered by the titanium industry and armed forces laboratories.

Assistance will be given to the research and development coordinating committee on materials, in the Defense Dept., in its appraisal of titanium research. Causes of fabrication difficulties will be analyzed in short-range laboratory studies.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Kit (radar), $3,955,795, Philco Corp., Phila., *W. MacMurtne.*

Helicopters, spares, 55, $3,000,000, United Aircraft Corp, Sikorsky Aircraft, Bridgeport 1, Conn., *J. M. Lemon.*

Wheel and brake assys, 876, $1,652,661, Bendix Aviation Corp., Bendix Prod. Div., South Bend 20, Ind., *G. I. Lyman.*

Aircraft, spare parts, $15,000,000, Convair Div., General Dynamics Corp., San Diego, Calif.

Body, gunsight camera, 2700, $620,885, Bulova Watch Co., Inc., Flushing 70, N. Y., *Frank Klopf.*

Automatic pilots parts, $1,216,372, Sperry Corp., Sperry Gyroscope Co., Div., Great Neck, N. Y., *George A. Dennis.*

Bombsights, 108, $2,595,271, Farrand Optical Co., Inc., New York.

Fire control system, tail, 58, $2,000,000, American Bosch Arma Corp., Arma Div., Garden City, L. I., N. Y.

Aircraft, 215, $12,607,898, North American Aviation, Inc., Los Angeles 45, Calif., *M. J. Dubuc.*

Jack, hand hyd, 525 ea, $358,158, The Lewis Welding & Engineering Corp., Bedford, O.

Destroyers, 2, $32,500,000, Bethlehem Steel Co., New York.

Note Skill Shortage

U. S. Labor Dept. is now taking official note of the apprentice shortage in skilled industries. It plans to sponsor a series of labor-management - government conferences this spring and summer. Aim is to attract more young men into apprentice training.

HEADS UP SUPERCARRIER: Capt. Roy L. Johnson, veteran naval aviator, will be commanding officer of first U. S. supercarrier, *USS Forrestal.*

The need to raise the level of skills of the U. S. work force is urgent. It is estimated that in 10 years training will have to be increased greatly—both in quantity and quality of the workers. This growth will be necessary if the U. S. work force is to keep up with technological improvements in industry.

"I certainly get fed up with people, don't you?"

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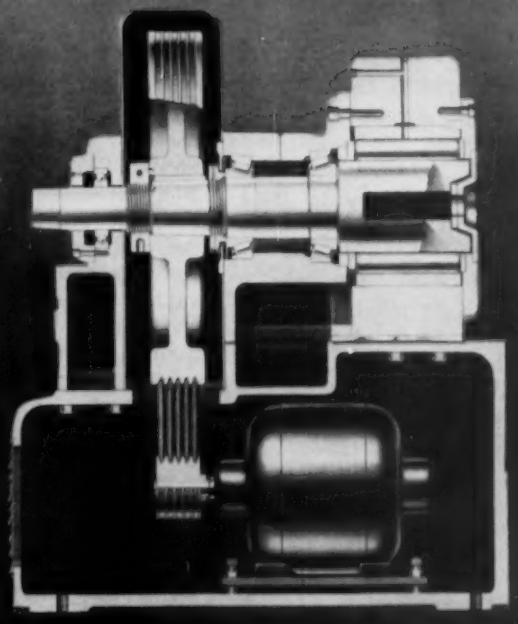
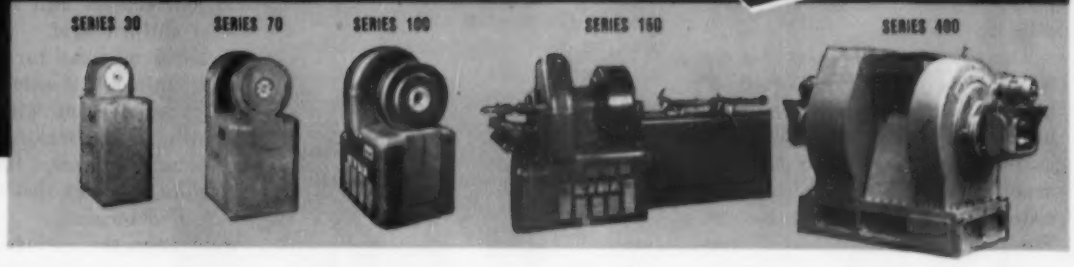
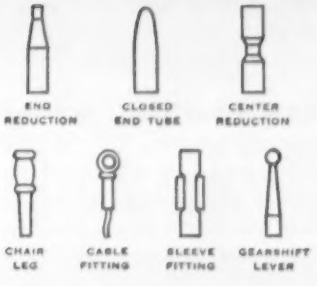


A COMPLETE RANGE OF SIZES AND CAPACITIES



For tapering, sizing, reducing and forming to special shapes of round solids and steel tubing, the Etna Swaging Machine offers the ultimate in modern machine design. Regardless of size and description of the job to be done, there's an Etna swager right for *greater production*. Write today regarding your specific job problems.



It's New! Get full information on the blending into the wall of I. D. Bead on steel and stainless steel tube with Etna Swagers resulting in mirror finish. Bead also removed on conduit.

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EXPANSION IN INDUSTRY

Atoms:

Westinghouse will build test reactor center with own funds.

Westinghouse Electric Corp. is planning to build the first industry-owned nuclear materials test reactor on a 550-acre site near Blairsville, Pa., which would eventually become a "reactor center" available to all industry.

Westinghouse President Gwilym A. Price announced his company will invest $6.5 million dollars in the installation, bringing to some $10 million the amount spent by Westinghouse for nuclear research.

Mr. Price said the test reactor will provide the tools needed to test reactor fuel elements, metals, and other components of atomic power plants under actual operating conditions.

The Westinghouse test reactor will operate in the range of 10,000 kw. Mr. Price said the plant will be in full operation within two years. It will use highly enriched uranium as a power source, and water as moderator and coolant. The uranium will be leased from Atomic Energy Commission and expended material will be returned to AEC for processing.

New Facilities Added

Producto Machine Co., Bridgeport, is completing a $750,000 development and modernization program of plant facilities. The firm manufactures die sets, die accessories and machine tools.

Among new installations are a modern cupola and continuous flow ladle.

Other additions include a dust collector installation on the cupola stack and a modern blower system installation.

The company has also added several new machines to its production lines.

Set New Record

Inland Steel Co.'s Indiana Harbor works set a new record in March in steel production and shipments.

Last month's shipments from the plant totaled 348,877 tons, compared with 341,079 tons in March, 1953.

The plant's 40 openhearth furnaces poured 438,809 tons of ingots for the month, a gain over the previous record of 430,978 tons set in December 1954.

Total output of 1,241,804 tons for first quarter this year exceeded the previous high of 1,203,351 tons in the second quarter of last year.

New Storage Tract

Construction has been started by The Chesapeake and Ohio Railway on new ore-storing facilities at Riverville, Va.

The undertaking is the result of General Services Administration's need for stock piling an estimated 400,000 tons of ore from domestic sources.

The new facility, covering more than 15 acres, will cost over $100,000.

Erect New Warehouse

Wheeling Corrugating Co., Wheeling, W. Va., will erect a new one-story warehouse in Minneapolis. Cost of the structure and land will exceed $450,000.

Among products distributed by the company which serves the North-Central states area are galvanized wire, galvanized sheets and roofing, conductor pipe, expanded metal lath and building supplies.

Many of the firm's products will be used in construction of the new facility.

Add New Acid Unit

Du Pont Co.'s East Chicago Works Grasselli Chemicals Dept. has begun commercial operation of a new contact unit for production of sulfuric acid.

The new unit can turn out more than a trainload of acid a week.

Plant production will be used primarily in the making of steel, petroleum products, insecticides, explosives, storage batteries and synthetic detergents.

Acid from the new facility will supply customers in the Illinois-Indiana-Wisconsin area.

Furnace on Again

U. S. Steel Corp.'s Fairfield Works, Birmingham, has begun operation of blast furnace No. 7, down since January for relining.

The furnace firebrick lining, and that of two hot blast stoves which serve it, is the first manufactured in the South.

Before shutdown, the furnace was in continuous operation since April, 1949. During that period, it processed more than 9.5 million tons of raw materials to produce nearly 2.5 million tons of iron.

New linings were supplied by Harbison-Walker Refractories Co.

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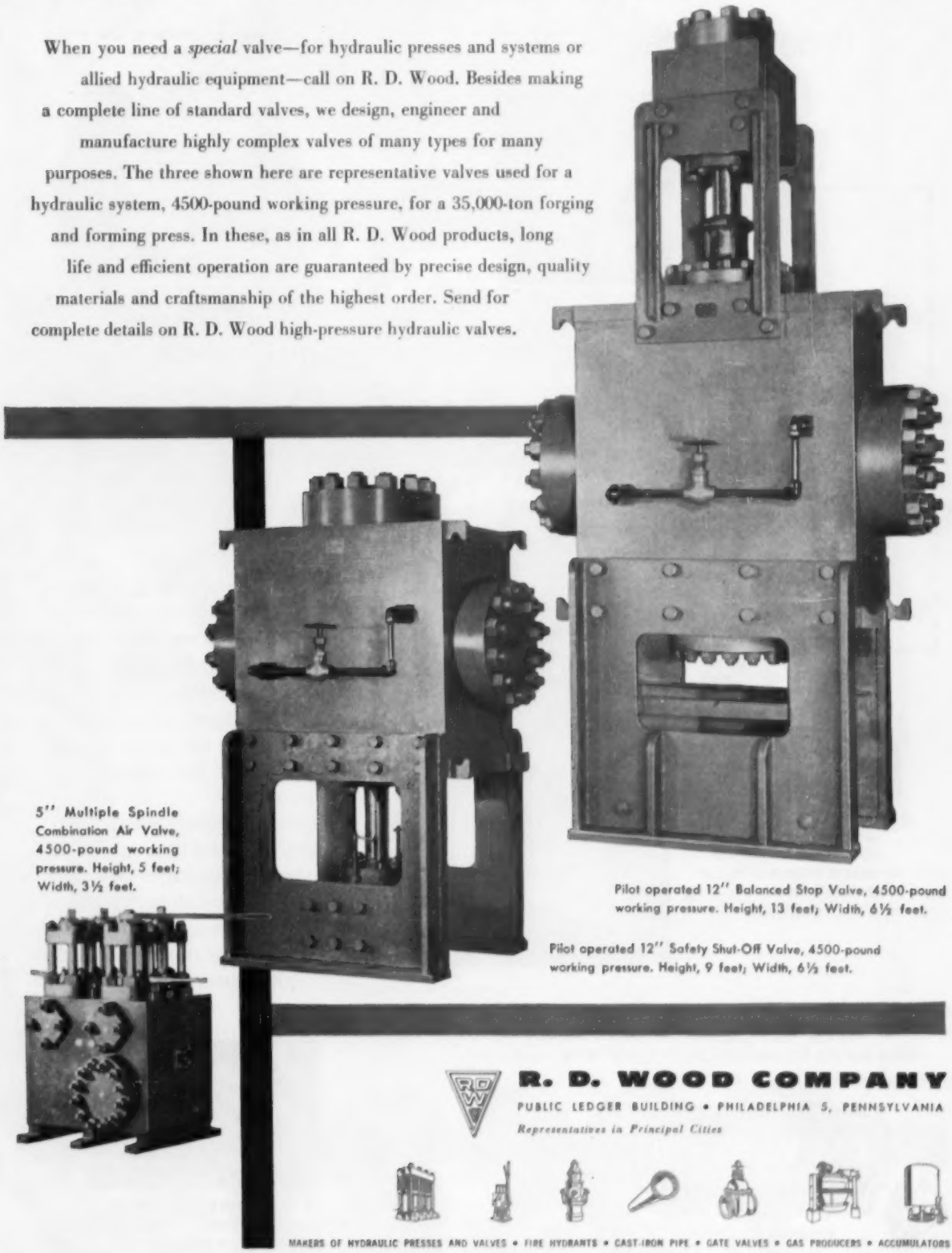
When you need a *special* valve—for hydraulic presses and systems or allied hydraulic equipment—call on R. D. Wood. Besides making a complete line of standard valves, we design, engineer and manufacture highly complex valves of many types for many purposes. The three shown here are representative valves used for a hydraulic system, 4500-pound working pressure, for a 35,000-ton forging and forming press. In these, as in all R. D. Wood products, long life and efficient operation are guaranteed by precise design, quality materials and craftsmanship of the highest order. Send for complete details on R. D. Wood high-pressure hydraulic valves.



5'' Multiple Spindle Combination Air Valve, 4500-pound working pressure. Height, 5 feet; Width, 3½ feet.

Pilot operated 12'' Balanced Stop Valve, 4500-pound working pressure. Height, 13 feet; Width, 6½ feet.

Pilot operated 12'' Safety Shut-Off Valve, 4500-pound working pressure. Height, 9 feet; Width, 6½ feet.

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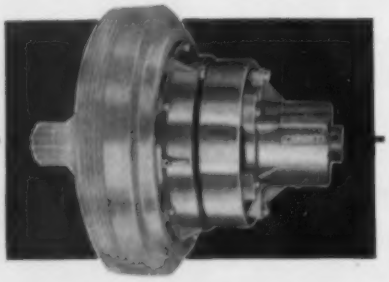
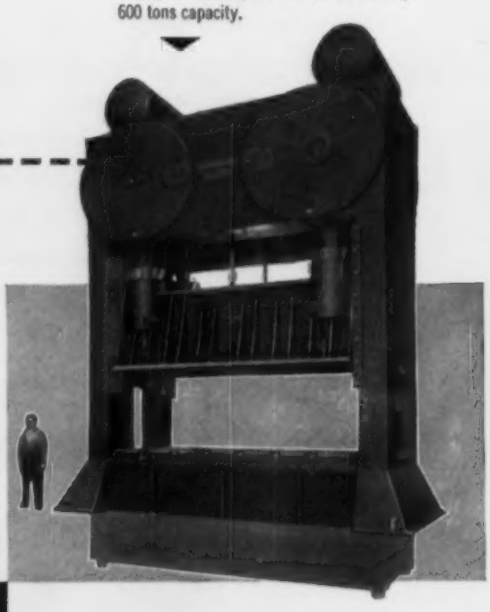
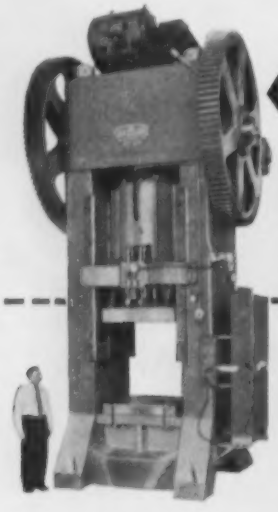


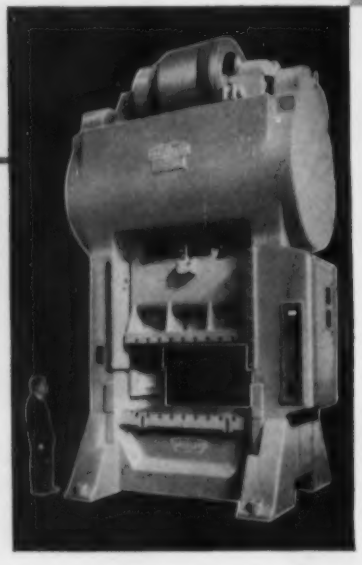
"Revolutionizing" Production

Cleveland S 4-600-204-102 Four Point Press, 40" stroke, 102 x 204" bed area, 600 tons capacity.



Cleveland S 1-800 Single Crank Press double geared, 16" stroke, 48 x 42" bed area, 800 tons capacity.





Cleveland S 2-350-60-42 Double Crank Press, 8" stroke, 42 x 60" bed area, 350 tons capacity.

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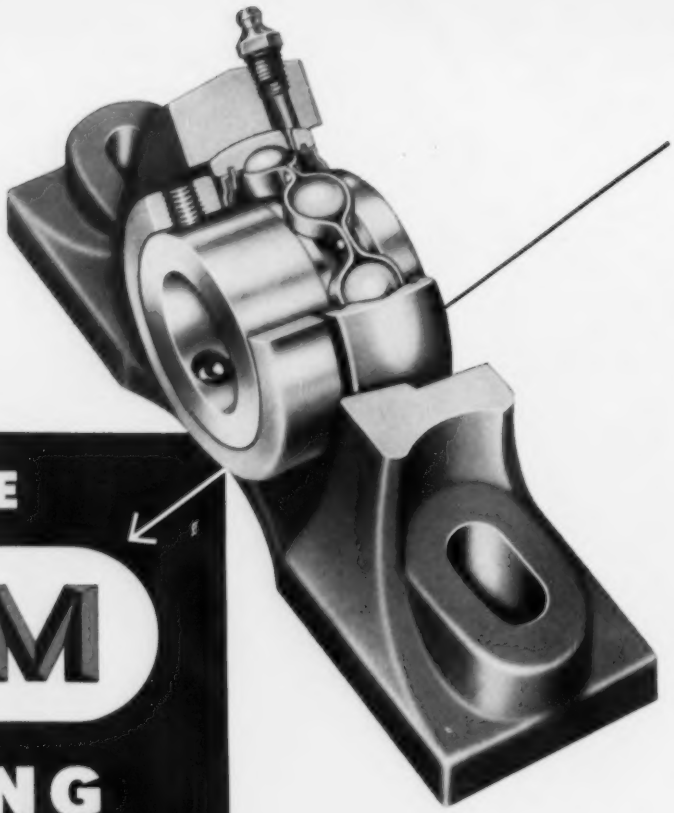

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Designed for medium duty, these new bearings are of heavier construction, with complete new housings. Metallic-backed Neoprene seals keep lubricant in, dust and dirt out of the bearing. Engineered to stay put, *the seal won't blow!*

S C M bearings are new members of the famous Dodge 30,000 hour line, all of which are sealed, both on and off the shaft. Fully assembled and pre-lubricated at the factory, they are ready to slip on the shaft. Available from Distributors' stocks in shaft sizes from 1-7/16" to 3-7/16".

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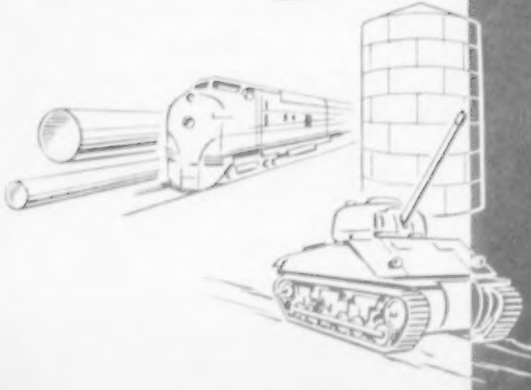

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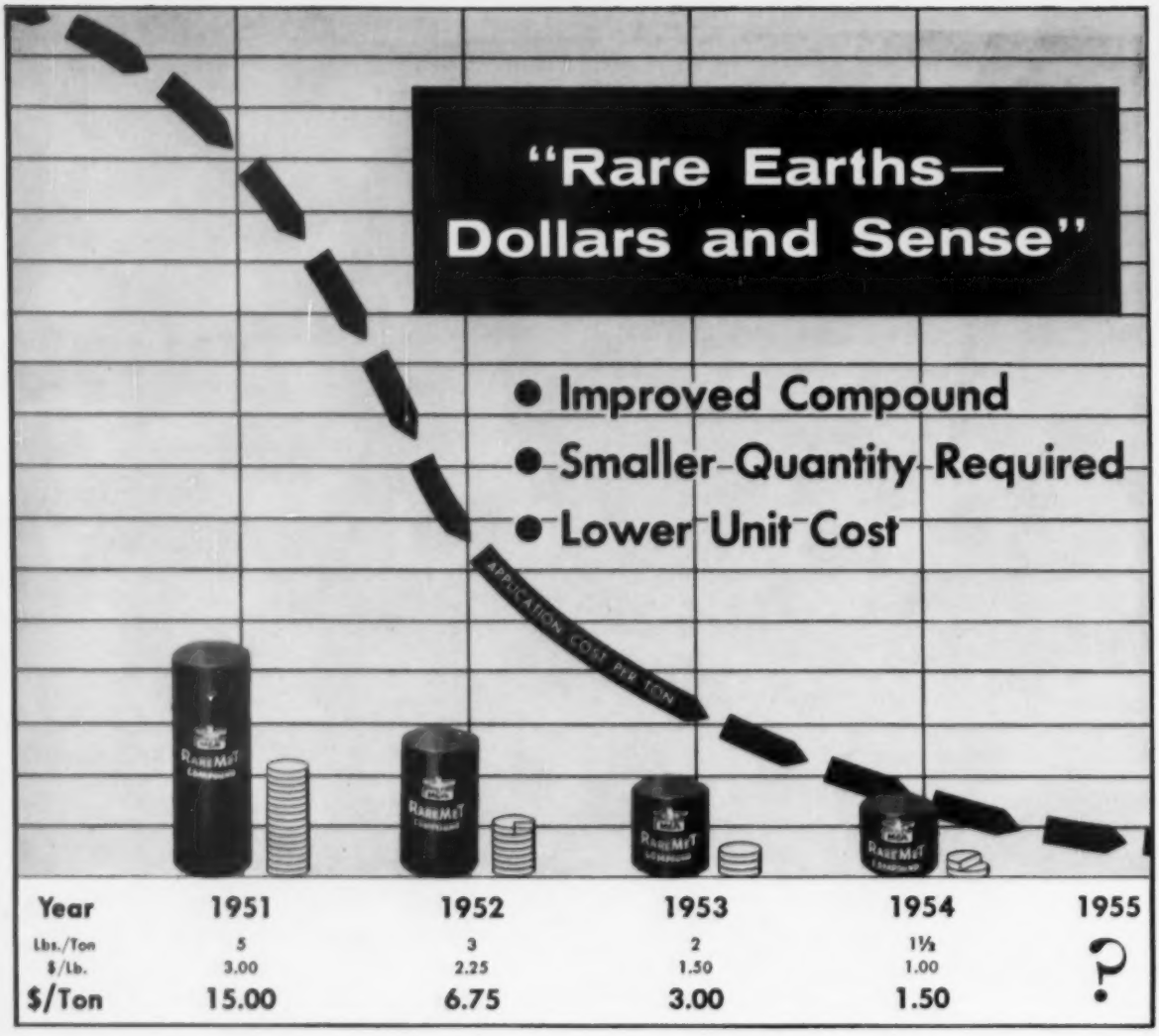

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Most steel producers, conscious of their customers' increasing demands for better quality, greater uniformity, and consistently good iron and steel are actively engaged in research employing rare earths. If the cost of iron and steel producing is at all interesting to you, or if customer rejections play any part in your operations, it will pay you to investigate the intelligent use of MCA RareMeT Compound. A letter addressed to any office will bring prompt and confidential response.

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Report To Management

Watch for Defense Spending Pickup

You can figure defense spending for fiscal '56 will be upped from the $34 billion now planned. Amount of the increase could run up to several billion dollars which of course means added strength for the growing economic boom (see p. 51).

Pressure for boosting defense outlays is coming from two sides: the military, as might be expected, and also Congress—particularly the Democrats.

An important factor in the double-take now being given the defense budget is the drift in military and Administration thinking away from the massive retaliation defense concept.

Many of our top military men have been seriously concerned about the stress our defense planners have placed on shoot-the-works H- and A-bombs. Pentagon sources believe the Soviet will be on a par with us in ability to produce supernuclear weapons within 3 years at the most. When they do, the Reds will have the balance of power riding for them because of their massive manpower supply. And by then they may also have a bigger arsenal of conventional weapons.

Communist tactics then would be to rely on small wars to get what they want. And we'd be left sitting on our stock of H-bombs that we'd be afraid to set off.

The military has convinced many top Administration officials of the need for a build-up of more conventional defense forces. Specifically this would mean greater outlays for small tactical A-weapons, more aircraft and more combat troops.-Odds right now are that the military manpower cuts won't be so great as originally scheduled.

Forces in Congress opposing the manpower paring received support last week when Gen. Ridgway, Army chief of staff, admitted to a Senate appropriations subcommittee that the Joint Chiefs had not approved the military manpower cutbacks. This served as a go-ahead for many of the Democrats who all along were opposed to the reduction in Armed Forces but feared tangling openly with the President on a matter of military strategy.

What it all points to is this: We'll continue to try to hold on to our superiority in the big bang department, but we'll also try to put ourselves in better shape for small wars like Korea and Indochina. It can't miss meaning industry will be getting more defense dollars.

Boom Biceps in Good Shape

There's still no sign of a letup in the economy's three biggest boosters: automotive, construction and steel. **Automotive:** Retail sales of General Motors passenger cars in the first quarter were the highest for any quarter in the company's history. March sales set a record for any previous single month. **Construction:** Value of new construction set in place in March totaled $2.9 billion, a new high for the month. March also marked the end of the most active quarter on record, with construction valued at $8.4 billion, 13 pct ahead of '54's record breaking first quarter. **Steel:** The market is tighter than ever. Cold-rolled sheets are booked through third quarter, and there's a tight squeeze on plates and structurals. For that matter, no steel items are in easy supply. And the ingot rate can't miss hitting 96 or 97 pct of capacity by the end of the month.

When the Atom Plants Take Over . . .

Add to your look-ahead book: By 1980 65 pct of all new generating installations in the U. S. will be run by atomic energy—so says General Electric. But even though the number of nuclear plants will be increasing at a rapid rate, enough conventional plants will still be added so that coal requirements for these plants will be on the increase through 1980.

INDUSTRIAL BRIEFS

New Organization . . . The Society of Die Casting Engineers, a new technical society, has been formed to promote technological advancement in the field of die casting and finishing of metals and die molding of plastics and powdered metals. Society headquarters are located at 19370 James Couzens Hwy., Detroit.

New Located . . . New York and Chicago executive offices of U. S. Industries, Inc., are now located at 250 Park Ave., New York.

Forms Firm . . . The firm of Currie & Van Dyck was recently formed. Thomas Currie and Kenneth Van Dyck, both members of the Society of Industrial Engineers, have located their offices in Southport, Conn.

An Order . . . An order valued at approximately $200,000, for electronic tracer controls, has been placed at General Electric Co.'s Specialty Control Dept. by the Bullard Co.

Agreement Signed . . . An agreement has been signed between Armco International Corp. and Stahlwerke Bochum of Bochum, Germany, granting the West German company a license for the manufacture of silicon steel sheets using Armco methods.

Made a Change . . . The Los Angeles district office of Norton Co. has moved to 5905 Pacific Blvd., Huntington Park, Calif. Robert W. Cushman heads the office.

Names Contractor . . . De Laval Pacific Co. and De Laval Turbine Pacific Co., San Francisco, have selected Rothschild, Raffin & Weirick as general contractors to erect their new $500,000 Millbrae headquarters. Completion is expected in late June.

Parlin Award . . . Thomas Mellon Evans, president, H. K. Porter Co., Inc., Pittsburgh, will receive the Eleventh Annual Parlin Memorial Award from the American Marketing Assn., in early May. This award is given annually for "outstanding contribution to the field of marketing."

Merged . . . National-U. S. Radiator Corp. was recently formed as a result of the merger of The National Radiator Co., Johnstown, Pa. and U. S. Radiator Corp., Detroit. General offices in Johnstown of the merged corporation will have combined net sales of over $50 million and combined assets of approximately $28,500,000.

Correction . . . A recent item on Atlantic Steel's expansion said electrical consumption was 500.3 KWH per net ton and the company used 9½ tons of electrodes per ton of ingots. It should have read, "9½ pounds of electrodes."

Gets Orders . . . Receipt of orders for wind tunnel equipment valued at $1,300,000 was recently announced by Westinghouse Electric Corp. plant, Sunnyvale, Calif.

Civic Consciousness . . . "Invest-in-America Week" will be observed April 25-May 1 in Detroit, with a committee of 29 of Detroit's top civic and business leaders helping to increase the consciousness of Detroiters of their stake in America. Purpose of the campaign is to make each American aware of his importance as an investor in his country and its free-enterprise system.

Agents . . . Pickands Mather & Co., Cleveland, has been made exclusive sales agent for Globe Iron Co. and its subsidiary, Globe Metallurgical Corp., for the sale of all their products.

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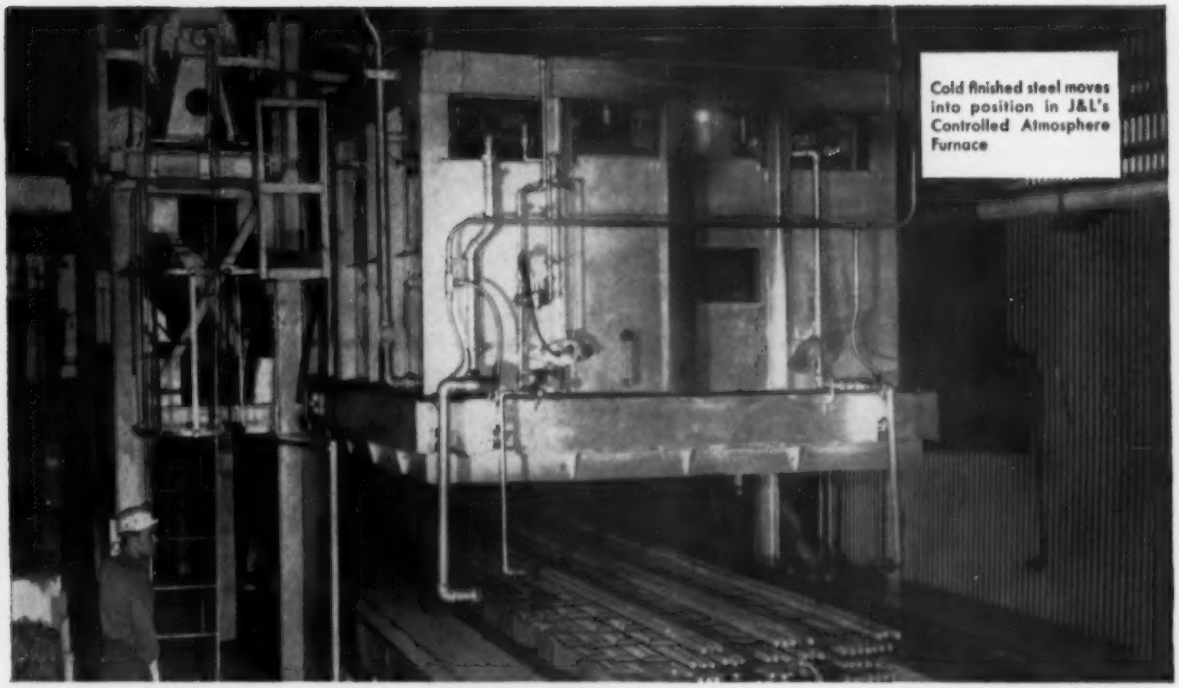

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AUTOMOTIVE ASSEMBLY LINE

Auto Stylists Dream of '59 Models

Designers look far ahead to future model changes . . . Mechanical and styling features are under constant study . . . Stylists work within engineering limits . . . Changes cost millions—*By T. L. Carry.*

◆ SOME STYLING and mechanical improvements on new cars the public will buy in 1959 will be at least four years old by then.

It is no secret that the major automotive companies have already completed their 1956 models. It is also well known that 1957 models are well on the way to completion. But it is surprising to learn that plans for the 1958 cars are nearly off the boards and stylists and engineers are beginning to think in terms of 1959 models.

Lead time for a complete change in autos is usually 2½ to 3 years. But even before that, auto companies are working on improvements in their future products. It is hard to say when the actual planning for a new model car really begins. Some changes in style and design are arrived at through a process of continuous consultation between various departments within an auto company.

Study Reactions . . . For example, at the Chrysler Corp. the service departments of the auto divisions will receive complaints about the operating efficiency of a car's motor or body. At the same time, people in the sales offices will be recording customer reaction to styling and make suggestions to help make the car more appealing from a sales standpoint.

In addition, independent agencies submit results of opinion polls they have taken for the corporation. These viewpoints are then reconciled and decisions about the new car are made by top executives of the corporation and the division concerned. Then engineers and stylists are called in and preliminary plans for a new car begin to take shape on the drawing board.

But the time that a car will roll off the assembly line is still a long way off. Stylists are controlled in their design by engineering requirements. The chassis of a car controls the body design. By the same token, the overall height of a car, the length and ground clearance desired are factors that control the design of a chassis.

If a new body style is considered the most important part of a new model, it is sometimes necessary to modify the chassis. On the other hand, if the chassis is to stay the same, the body style must meet its (the chassis) requirements and still give the pleasing appearance that helps sell cars.

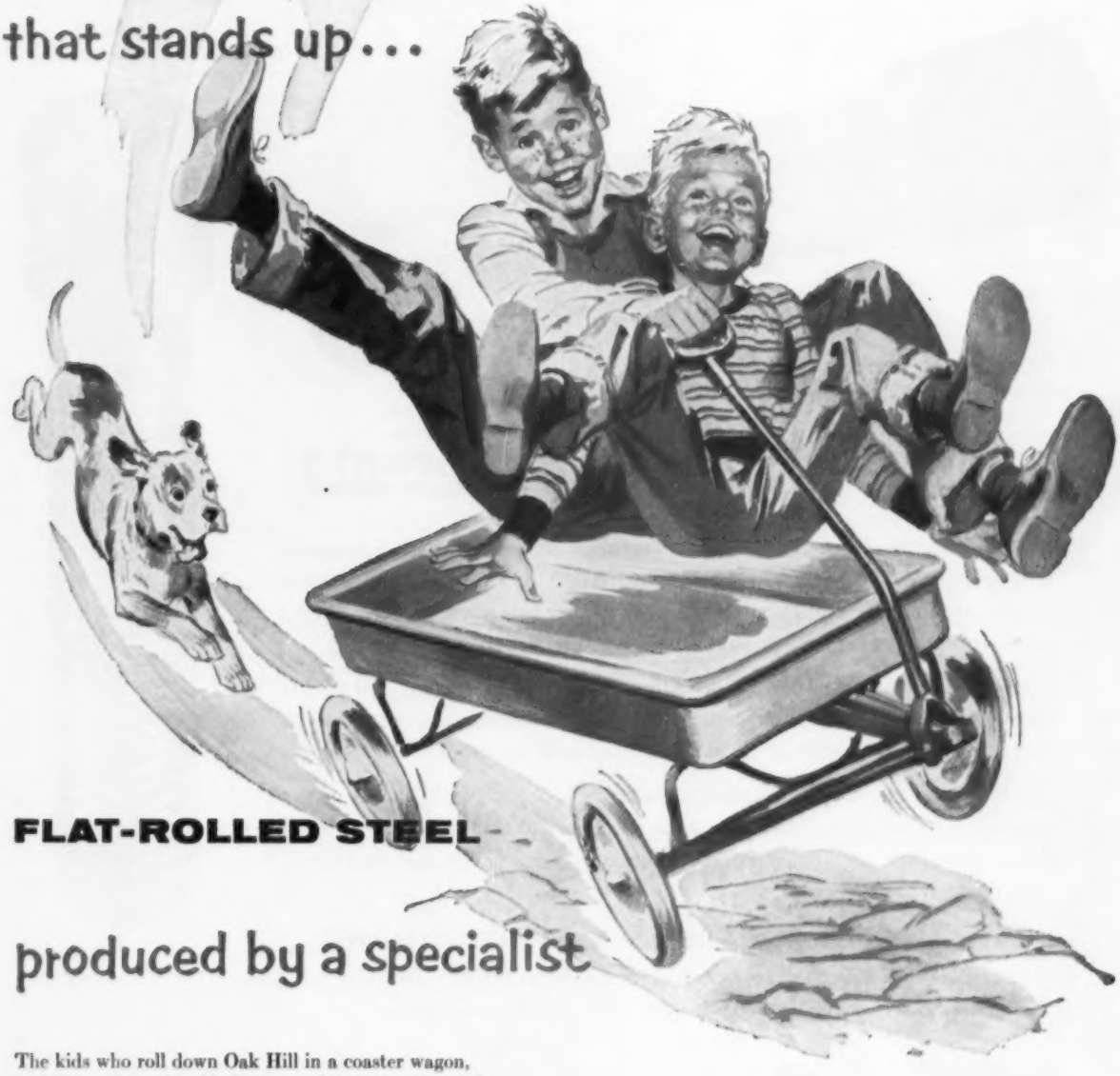
STYLING concepts of the future are studied by Virgil M. Exner, Chrysler's director of styling, who is already looking ahead to 1959.

Must Be Practical . . . Chrysler Corp. has a separate styling studio for each of its divisions. Each studio works independently but their work is coordinated by the director of styling, Virgil Exner. Once preliminary plans are drawn and approved, a small scale model is completed in clay. If any flaws show up at this stage, various changes can be suggested by Exner and executives of the corporation and the particular division concerned.

While the plans are still in the early stages, production experts work constantly with the stylists. It sometimes happens that, while

for transportation equipment

that stands up...



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"Sockets" are just one of the fastener styles CleCap makes. On any of the items cataloged below, let CleCap show you how they can make your idea of delivery a reality. If you haven't tasted CleCap service you've missed a thrill.

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WEEK ENDING	CARS	TRUCKS
Apr. 9, 1955	177,250	30,457
Apr. 2, 1955	187,418	31,019
Apr. 10, 1954	128,058	24,016
Apr. 3, 1954	122,752	23,746

*Estimated. Source: *Ward's Reports*

a particular part of a new design may be desired by stylists, it is rejected because it is not practical to make it with existing tools and materials.

The closer a car is to completion, the harder it is to change its design. From the first small clay model, a full sized car, with suggested changes, is constructed—also in clay. Changes can also be made on this model, but by the time the car reaches the plastic mockup stage, only relatively minor changes can be effected. Some of the dies are already being constructed by this time. Dies for the inside door panels, because of their complicated structure, take the longest time to make. Once completed, there is not enough time left to change them.

Styling is only part of the problem of producing a new car. Mechanical changes are considered long before a stylist puts his pencil to the drawing board. If a completely new V-8 engine is to be produced, a workable model must first be decided on. This can take as long as three years. After completion, the motor has to be tested for at least two more years to iron out the bugs. Then the engine is ready for production.

Seek Better Suspension . . . Development of a new type suspension is measured in decades. Basically, the Big Three automakers are still using a suspension system that was introduced to the industry in 1934. Although the system has become highly refined and modified, engineers are still seeking a better type of suspension at a reasonable cost to the consumer.

In their search for a new suspension, engineers are seeking a system that gives even better riding qualities than today's methods but will still have good road keeping qualities. In some cases, they have been working on this problem for 15 years. The work is still going on and will continue until a better system is found.

Costs of model changeovers are closely watched, and necessarily so. An auto company which makes 1.5 million cars a year would add $15,000 to its costs if the price of only one part was raised one cent.

Model changeovers in the industry fall into two categories. One is a face lifting where changes are introduced on existing models. The other is a complete change. The cost of a face lifting is estimated at as much as $100 million or more if important mechanical changes are also involved. A complete change calls for a much bigger outlay. For example, Chrysler estimates the cost of changes this year was in the vicinity of $250 million.

High Speed Tire

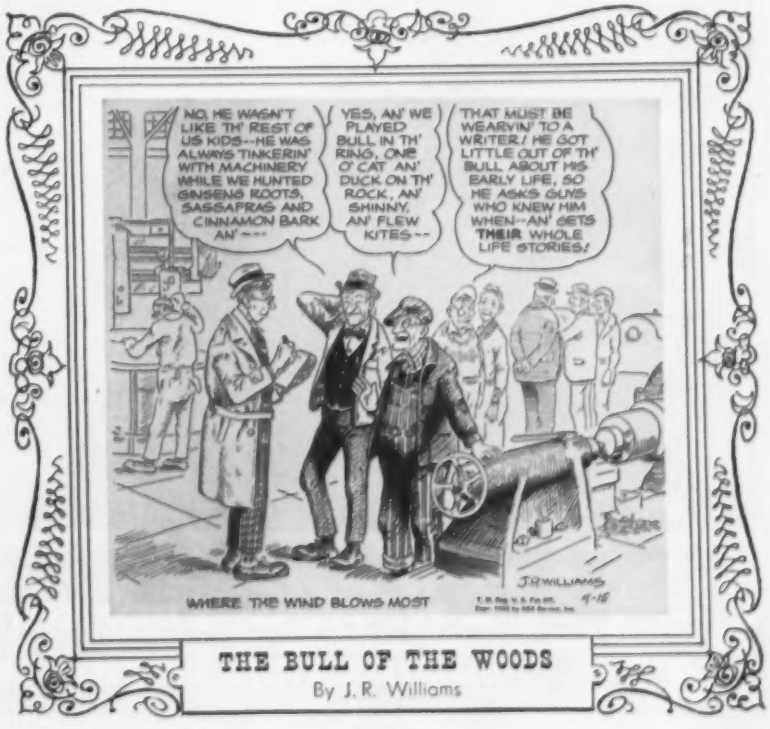
A new tire, designed specifically for cars with high horsepower and speed ratings, is being produced by the Goodyear Tire & Rubber Co. Built with nylon cord, the tire incorporates the basic qualities of the Goodyear tire used in the Pan-American road races. Available in either tubeless or standard versions, it is designed for maximum safety under all driving conditions.

One of the tire's features is the lower cord angle of its plies. This results in a better road hugging surface and helps eliminate tire distortion. It also makes the tire cooler running. Currently being produced only in the 8.00 x 15 size with reversible white sidewall, additional sizes will be added later.

Ford Turbine Unit

Ford Motor Co. has developed a heat exchanger, the basic component of an automotive-type gas turbine. It was engineered and tested at the company's laboratories in Dearborn.

Heart of the unit is a porous metal disk, 3 in. thick and 22 in. in diam. As this disk rotates, heat from the exhaust gas is absorbed by it and preheats incoming air prior to combustion. A fuel saving is realized, since the preheating is done by recovering energy.



THE BULL OF THE WOODS

By J. R. Williams

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TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR on television . . . Saturday nights, NBC.

Merger Heat Cools As Trend Eases

Barnes reports no increase in numbers but warns of economic danger . . . Congressmen see public interest, react with series of merger probes . . . Investigating functions overlap—By G. H. Baker.

◆ THE SO-CALLED "wave of mergers" — currently one of the most popular political footballs around Washington—may turn out to be just a mild ripple.

Stanley N. Barnes, assistant attorney general for antitrust, reveals during testimony before the House appropriations committee that "as near as I can tell from the statistics there are no more mergers this year than there were the preceding year, and there were no more mergers in 1953 than there were in 1952."

He did not compare the number of mergers for earlier years, indicating that a plateau in the number of consolidations may have been reached in 1952.

He warns, however, that "they are of increasing concern to a great many areas of American business and economic thought, by reason of the fact that the mergers now involve larger economic concentrations, more money, and larger companies."

Nevertheless, two separate types of antitrust investigations are brewing in Washington in the wake of the mergers and the interest spurred by government studies.

Wants Special Measures . . . Federal Trade Commission, readying a study of the extent and significance of the current merger trend, now has a special "task force" of 13 legal staff personnel to pin-point corporation mergers which might have an adverse effect on the economy, decide how to proceed against these mergers, and develop amendments to existing administrative antitrust rules.

"We must take the merger problem out of routine channels and give special, preferred attention to corporate moves that have heavy impact on economy and competition," Edward F. Howrey, FTC chairman says. The merger movement has become "too big a thing for the government to police through regular channels," he adds.

Meanwhile, another antitrust study is announced by Sen. Harley M. Kilgore, D., W. Va., chairman of the Senate judiciary committee. Sen. Kilgore, with a $200,000 appropriation and Joseph W. Burns, former Justice Dept. antitrust lawyer, says his "full scale" antitrust and monopoly probe will get underway within the next several weeks.

They Love It . . . The committee will attempt, the Senator says, to achieve a "realignment" of the antitrust laws to develop an antitrust policy "which can be enforced vigorously, effectively and uniformly to achieve the desired goal of competition in a free economy." He contends that Congress has not surveyed the entire field of antitrust laws since the Sherman Act was passed 65 years ago.

There are other congressional committees which have hinted they would like to get into what is becoming one of the most popular political subjects this year—the wave of mergers and the adequacy of the antitrust laws. At least one other committee, the House judiciary committee, will probably conduct a similar study.

Ike Won't Meddle . . . "Hands-off" will be the Eisenhower Administration's policy with respect to the automobile industry's current talks with Walter Reuther on

Answer the Questions

Don't throw away those forms from the U. S. Census Bureau. It could land you in jail and cost you money as well.

All persons and firms receiving U. S. census forms to be completed are required by law to complete the forms and to return them to the U. S. Census Bur. Failure to complete and return the forms can mean a fine of $500 or 90 days in jail, or both.

U. S. Census Bureau has mailed out about 2,225,000 forms in connection with its census of business, manufacturers, and minerals. It hopes to get back at least 2 million "usable" (that is, completely filled-in) forms. If it gets back fewer than 2 million usable forms, it plans to start penalty action against the offenders.

Census Bur. is waiting until income tax matters are cleared up, but after April 15, it wants action and expects the forms.

AIR engineering at work
REPORT No. 4400.05

Running Ten Nuts at a Crack...

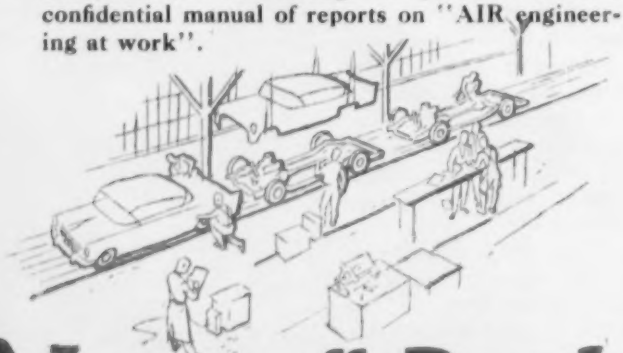
SAVES $12,000 *a year!*

This large auto manufacturer formerly used two ¼ ton presses to position a differential carrier in the rear axle housing. Then the ten ⅜" nuts were run individually. Only experienced operators could control torque so that it met specifications. Naturally the engineers wanted to eliminate the press operation and improve torque control.

AIR engineering by Ingersoll-Rand provided the answer and saved $12,000 a year. A 10-Spindle Multiple Nut Runner is now suspended over the moving conveyor. The differential carrier is hand set on the housing, and dropped to within ⅛" of its final location. The 10-spindle nut runner quickly and accurately draws it into final position as it runs all 10 nuts at once . . . and to the required 50 ft. lbs. torque. The press operation is eliminated, and simultaneous running of the nuts eliminates binding.

If you are in any way responsible for cutting costs in your plant, write us on your company letterhead, and we will arrange for you to see I-R's confidential manual of reports on "AIR engineering at work".

Ingersoll-Rand Multiple Nut Runner runs 10 nuts at once, all to exact torque.



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AIR engineering Manual

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the subject of wages and benefits.

Top White House advisers doped it out that the Administration could hardly hope to gain anything by jumping into the fray at this point, and might conceivably lose prestige by voicing any premature opinions on the subject of guaranteed wage plans.

Secretary of Labor Mitchell undoubtedly had Mr. Eisenhower's support when he said the government has an obligation to let labor and management bargain freely and to avoid any unwarranted meddling.

See Tax Cuts . . . Tax cuts for individuals are definitely in the works for next year. The Eisenhower Administration is not yet ready to spell out its plans, but advance reports seeping out of the Treasury Dept. indicate that Mr. Eisenhower will ask Congress early next year to vote everybody a tax break and to place particular emphasis on reductions for lower-income groups.

Mr. Eisenhower is firmly on record as saying that there won't be any tax reduction unless the federal budget is in balance. Latest reports from Treasury experts suggest that a balanced budget by June, 1956, is a good possibility.

Like all other tax and fiscal forecasts, however, this hope for a balanced budget assumes that the nation won't be at war in the next 12 months.

Chase Hot Cars . . . Fresh complaints of bootlegging in retail automobile sales are stirring up concern in Washington. In the Senate a special subcommittee, headed by Sen. A. S. Mike Monroney, D., Okla., is lining up the investigators who will look into the complaints. If necessary they'll call upon auto makers to take corrective action.

The inquiry won't stop there. Monroney plans also to look into "phantom freight" practices which he says require car buyers to pay freight charges that often are not genuine. Example: A car buyer in New York City is usually billed for freight from Detroit to New York, whereas the car probably was assembled in nearby New Jersey.

Still further, the Senate group will make its own study of what passenger car accessories actually cost the car-makers, and will demand to know why buyers often are billed "exorbitant" charges for unwanted frills on their new cars.

Bureaucracy:

Will government quit business functions?

Pressure from industry and Congress to get the government out of competition with private enterprise may finally be about to pay off. But at least one congressional committee is going to keep the pressure on to make sure.

Spokesmen for the Defense Dept. —probably the worst competitive offender—and the Budget Bureau say they will be able to show concrete results in their drive to end business-type activities within a few months.

The Defense Dept., a spokesman tells a Senate small business subcommittee, is now conducting an "aggressive program" to get the government out of competition, and in the last year has stopped or planned to stop 70 activities out of some 1000 operations surveyed.

Included among the operations to be discontinued are two aluminum sweating plants, seven scrap metal balers; 10 automobile and truck repair shops; four cement mixing plants; and 16 office repair shops.

WASHINGTON NEWS

Subcommittee members who have favored reductions in government competition, believe they have scored another important victory in the fight. The Defense Dept., after years of refusing, has finally agreed to compute Federal, state, and local taxes which their business-type operations don't pay in comparing government and business cost.

Demand Results

A spokesman for the Budget Bureau, now conducting a complete survey of all government operations which compete with private business, admits that the "precise extent" of competition isn't known. "We are convinced that it is unnecessarily large," the spokesman says.

Sen. Edward J. Thye, R., Minn., has warned officials the committee will continue to prod and harass the government until it gives "concrete evidence through deeds and not words that they are determined to remove this threat to American business."

Push A-Power Plants

Atomic Energy Commission is considering an industry sponsored plan for construction of four new nuclear power plants with total electrical capacity of 455,000.

Aggregate cost of the projects is to be about $150 million. Any of the proposals, says AEC, will be considered on a competitive basis within limits of the Agency's power reactor program.

One of the plants is to be a 180,000-kw boiling water reactor facility, to be built by the nuclear power group which consists of five companies in New York, California, Illinois, and Missouri. Completion is scheduled for 1960.

Another is a 100,000-kw light water moderated and cooled reactor plant proposed by the Yankee Atomic Electric Co. of Boston, with 12 member firms in New England. This plant is to be finished late in 1957.

A fast breeder reactor plant with a 100,000-kw capacity has been proposed by nine private and public enterprises.

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More Steel Needed for West Economy

New capacity would lead to more manufacture of steel products now "imported" from East . . . Diversification also needed for growing area population . . . Large market is guaranteed—By R. R. Kay.

◆ WEST COAST steel executives, blueprinting for the future, should put primary emphasis on boosting the variety and supply of steel.

Although the West has long been conscious of this need—and has come a long way in doing something about it—there's still lots of spade work to be done.

The pay-off is there. Many new steel-using industries will spring up if the raw materials are available locally to support them. Fertile markets for a variety of home made products are present. And the markets are growing more abundant as the West's population continues to boom.

For some time western industry has lagged behind both real and potential demand. Two and a half million tons of products heavy in steel content are still being shipped in from other areas. This includes 1.5 million tons of motor vehicles and parts and an additional million tons of machinery, agricultural equipment, household appliances, electrical equipment, and other products.

Profit Assured . . . Much of this tonnage should be fabricated here. This advice was handed out to a San Francisco meeting of the Western District Association of Iron and Steel Engineers by L. S. Dahl. He's vice-president of operations for Columbia-Geneva Steel Div. of U. S. Steel Corp.

With an adequate and diversified supply of steel available, plus freight differentials and other savings, it is a reasonable assumption that more of these products could be made here.

For example, the West each year "imports" a million tons of auto parts for assembly and replacements. It fabricates only 100,000 tons.

Housing Needed . . . Greater efforts should be made to narrow this gap, Mr. Dahl suggests. It's up to the western steel industry "to supply enough and as many kinds of steel as our swelling population requires."

Greater diversification and increased steel capacity are essential for the new highways, additional bridges, and more factories that are part of the West's industrial destiny.

And, Mr. Dahl predicted, steel needs will be tremendous to house the thousands of new families.

Titanium Surplus . . . The infant titanium industry is suffering growing pains. The metal's production is growing far faster than its consumption.

This should allay titanium shortage fears which have checked some production uses of titanium. High cost and technical difficulties have also restricted its use.

What about the future? Walter L. Finlay, vice-president and director of research, Rem-Cru Titanium, Inc., Midland, Pa., tackled this question at the Ninth Western Metal Congress in Los Angeles. He predicted that cost of sponge will drop and that mill products could well come down to half or less than half of today's prices.

But there are two if's: (1) Present gap between oversupply of titanium sponge and demand for titanium mill products must be closed. (2) Total U. S. demand by 1958-60 must reach 10-20,000 tons.

THREE FLAT cars were needed to ship this pressure vessel from U. S. Steel's Consolidated Western Steel Div. to the Shell Oil refinery at Anacortes, Wash. It will be used in gasoline vapor recovery.

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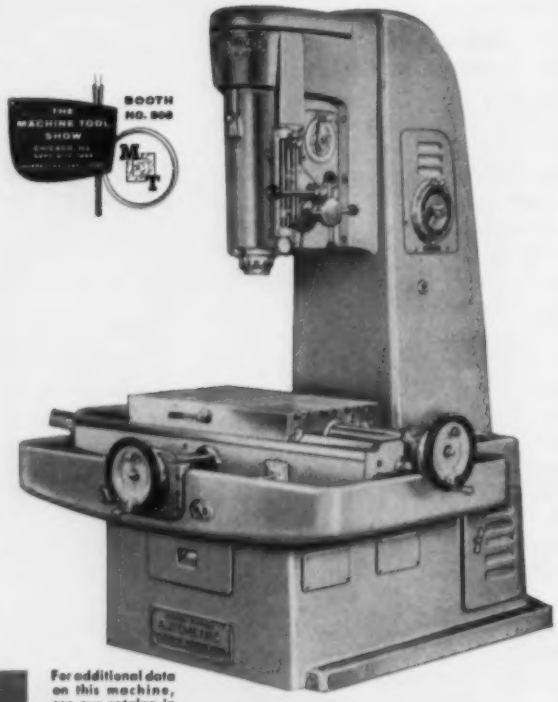
TOOL-LEASE PROGRAM

THINK of it! You can lease this new Model C Autometric boring machine for as little as 59 cents per hour! It's an exceptionally low price to pay for this modern, high precision-built boring machine, designed specifically for performing the most exacting operations in your toolroom, laboratory or shop.

Under Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years. What's more, this lease agreement permits you to terminate or purchase your Model C Autometric at the end of the third year or at the end of any year thereafter.

Under Kearney & Trecker's Tool Lease program you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.



For additional data on this machine, see our catalog in Sweet's.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

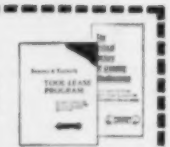
Precision Mechanisms Industry—Includes machines for laboratory, scientific and engineering instruments; mechanical measuring, controlling instruments; optical, surgical; medical, dental instruments and equipment; photographic equipment; watches, clocks, clockwork devices, and parts. Of the total 8,295 machines, 10% are over 20 years old, over 36% are 10 to 20 years old.10 to 20 years old.

Machines over 20 years old, which should definitely be replaced. | Machines 10-20 years old, which should probably be replaced. | Machines less than 10 years old.

882 automatic and manufacturing type milling machines	13%	43%	44%
2530 vertical milling machines	4%	30%	66%
4087 knee type horizontal milling machines	15%	40%	45%
380 bed type milling machines		31%	69%
396 horizontal and vertical precision boring machines	3%	23%	74%

Figures adapted from 1953 American Machinist survey of Metalworking Industry.

KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.
Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."



Name.....

Title.....

Company.....

Address.....

City..... Zone..... State.....

MACHINE TOOL HIGH SPOTS

Bright Prospects Cheer Builders

New orders show $60 million monthly average since December . . . Dip due for vacation months but market health should hold . . . Call for sales training to make most of current demand—By *E. J. Egan, Jr.*

◆ MOST of the near term and long range factors that affect the machine tool industry seem to point toward a bright future. From their present vantage point atop higher stacks of new orders than they've seen for a year and a half, builders can get a more hopeful panoramic view of the business outlook.

Let's take a look at some of the industry's traditional "areas of concern" and see how they appear in the bright spring sunshine.

New orders have been coming in at gratifyingly high levels since last December. Published figures show the industry has averaged slightly better than $60 million monthly in this category from December through February. Private reports point to a good March.

Orders May Dip . . . Builders admit the possibility, even the probability that new orders may dip below the $60 million level in some of the vacation months ahead. But their overall feeling is that a generally better "tone" for 1955 business was firmly established in the first quarter.

Machine tool dealer and distributor staffs are intent on doing everything they can to maintain this optimistic attitude. Capitalizing on the industry's recent sales momentum, members of the American Machine Tool Distributors Assn. chose "Better Selling" as the theme for their recent annual Spring convention.

Talk Training . . . AMTDA's panel discussions wasted little time on generalities, soon got down to bedrock talk on ways to select and train machine tool sales engineers. Consensus among distributors' sales executives is that they're putting their money on the right horse, by emphasizing better salesmanship.

Sales managers say it's one thing to take an order when a worn-out machine tool needs replacement. But it's another story to sell a prospect on the idea of replacing a perfectly usable piece of equipment with a new machine. For safety's sake the reasons had better be numerous — and obviously good.

Worry Less Now . . . With fewer worries about current business and dealer attitudes, builders also find less cause for concern about their forthcoming giant Machine Tool Show. Scheduled for a 12-day run in September at Chicago's International Amphitheater, it will be the first big display of U. S. metalworking equipment since 1947.

"We do need help, but it's hard to believe you've been a welder for 12 years."

In the dreary business atmosphere last fall, a few builders seemed to view the show as their last chance to make a bid for survival. Others appeared to accept the idea that they might just as well go along for the ride. The more optimistic and determined firms saw the show as a real opportunity to merchandise 8 years of steady machine improvement.

And their spirit of optimism has become very contagious. Most builders are now noticeably enthusiastic as the continuing high level of business is about to spill over into a terrific show promotion campaign.

Fears Fade . . . Another fear long shared by builders is that the government would either lease or sell at cut rates many of the machine tools from its huge inventory. But latest report to Congress on the status of the National Industrial Equipment Reserve should make pleasant spring reading for industry executives.

Items on lease from the NIER totaled 719 on January 1, 1954. On the first of January this year, only 464 items were on lease from the reserve on the usual monthly terms of 1 pct of the fair market value. This net reduction of 255 leased items during the year would seem to indicate that responsible officials are not anxious to undermine builders' markets.

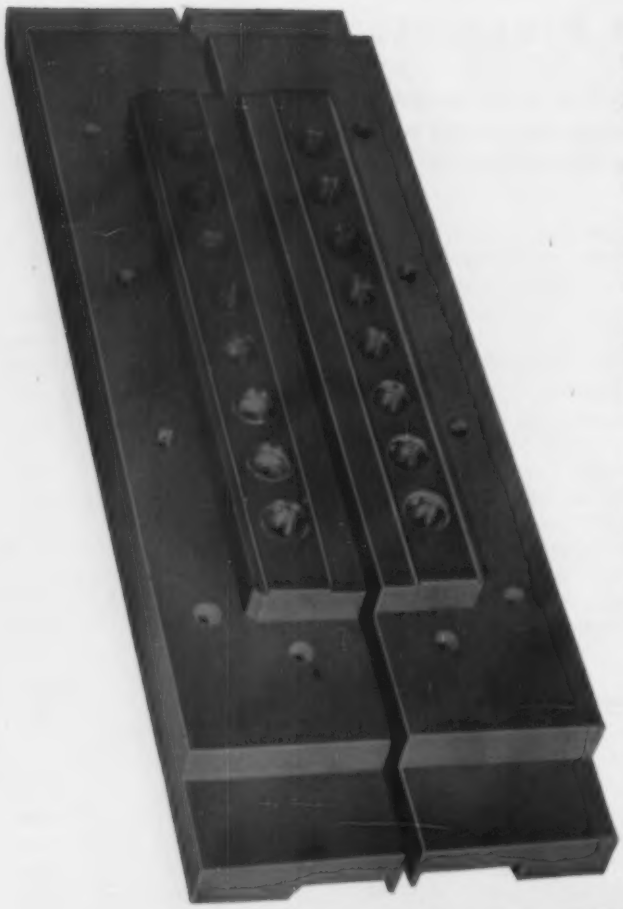
A total of 2586 items were also removed from the NIER in 1954 as obsolete or unserviceable.

REVERE

COPPER EXTRUDED SHAPE

SAVES

26% FOR TOCCO



Here is a "fishtail" and the Revere Copper Shape from which it is made. The part is a terminal block on a high frequency transformer, used in induction heating apparatus made by the Tocco Division of the Ohio Crankshaft Co., Cleveland, Ohio. Tocco is an important supplier of induction heating equipment to industry, which uses it for such diverse jobs as heat-treating and hardening, brazing, soldering, removal of gases from metal parts of vacuum tubes, vacuum casting, and heating before forging, upsetting, or other hot working.

The "fishtail" formerly was machined from solid copper bar, and on a typical run, the total cost for a certain number of pieces was $35,000. Revere studied the part with Tocco, and suggested that a shape would save money, even though the plain bar cost 10 cents less per pound. Actual experience produced these figures: total cost on the same number of fishtails, $25,700, a saving of $9,300, or 26.6%.

If your shop is machining plain rod or bar, it might pay you to consider the advantages of extruded shapes. Revere produces them in copper and its alloys, and aluminum alloys. Many design details can be preformed for you, provided they are parallel to the axis of extrusion. Revere would be glad to collaborate with you and see if shapes cannot save you money. See the nearest Revere Sales Office.

REVERE

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The Iron Age SALUTES

Howard F. McCullough

We look to men like him to keep us alive as the machine age advances and prosperity depends more and more on maintenance that will keep the wheels turning at a fast, steady, clip.

Push button production is great but what about when you push the button and nothing happens? You're in trouble, of course, and one of the first to see this was Howard F. McCullough, general manager of the service shops department at General Electric.

Early in the game Mac saw that mechanized industry called for new maintenance concepts. At the age of 17 he went from a western Pennsylvania high school into electrical maintenance work. He liked the field but he couldn't accept the current notion that a maintenance man was a guy who puttered around machines a while, picking up practical knowledge and devising homespun methods of machine care.

Feeling the work rated fuller technical background Mac returned to school. In 1935 he received a degree in electrical engineering from the University of Colorado.

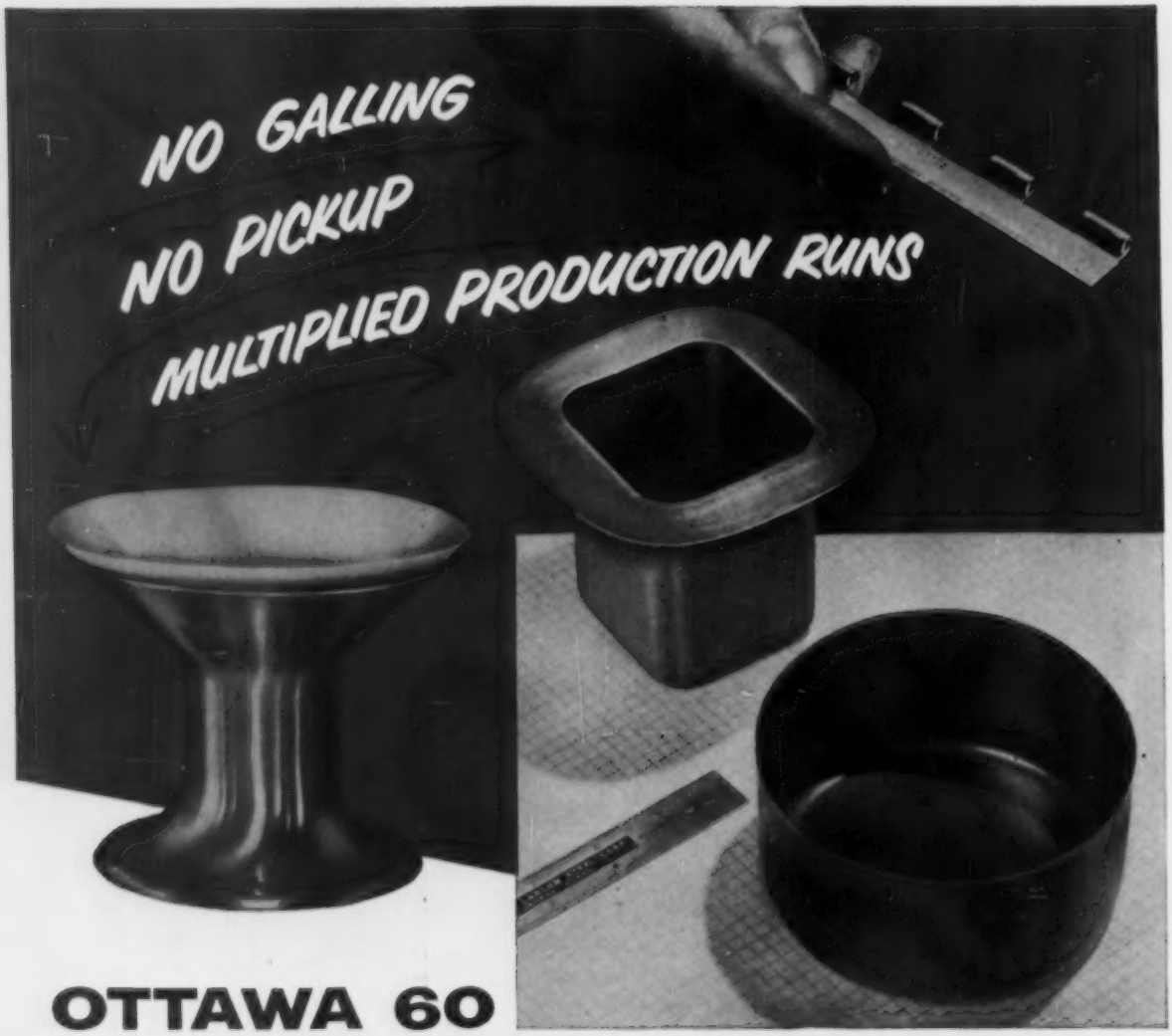
After graduation, Mac went with GE in the diesel electric locomotive department. Subsequent assignments in plant engineering and equipment design rounded out his experience.

In 1948 Mac became assistant manager of GE's service shops department, a field organization made up of 36 branches across the country. The next year he took over as general manager of the department.

Under his leadership, a stepped-up program of maintenance service and education has been launched. "The day of the grease-gun mechanic is gone," says Mac. He sees maintenance coming into its own as an essential production operation with detailed planning and modern techniques.

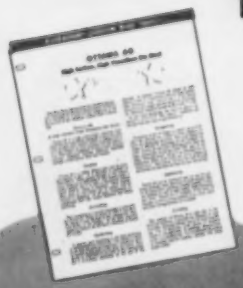
Other industrial leaders are joining in this refrain. There is no doubt that automation needs effective maintenance to stay in business. It's lucky that men like Mac saw what was coming and groomed themselves for key spots in modern maintenance programs.

Mac sticks pretty close to his job but in off hours he devotes time to a little old fashioned patching up around the house. He is a pleasant man who enjoys meeting people and can listen to a good story as well as tell one.



OTTAWA 60

for DRAW DIES is *NEW...and NEWS!*



Write for a copy of the OTTAWA 60 BLUE SHEET

This Blue Sheet contains certified data on the physical characteristics of Ottawa 60, prepared from carefully checked laboratory and field service tests. All the information you'll need on methods of handling and heat treatment, etc.

ADDRESS DEPT. A-64

In fact, this exclusive Allegheny Ludlum-developed die steel is mighty *good* news for any user of draw dies. Ottawa 60 is a high-carbon, high-vanadium analysis, initially designed for the primary purpose of drawing stainless steel.

In that service, Ottawa 60 does just exactly what it was developed to do: it performs without galling or pickup, and shows exceptional wear-resistance—as a long list of successful applications will prove to you. Two of them are illustrated above: a stainless hinge and a stainless sundae server.

But Ottawa 60 is a top performer on any draw die application! Also illustrated above are the two draws on a transformer housing of .037" gauge SAE 1010 strip. After more than 25,000 pieces—*over 12 times any previous runs*—there was still no sign of pickup, or of wear on the Ottawa 60 punch or die.

This analysis can solve your draw-die problem jobs—or reduce your costs on almost any drawing operation. ● Call on our Mill Service Staff for any assistance. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

For complete **MODERN** Tooling, call

Allegheny Ludlum

W&D 5581

AL® FINE TOOL STEELS SINCE 1854

The Iron Age INTRODUCES

ROBERT F. NELSON, elected president and general manager, Modern Engraving & Machine Co., Hillside, N. J.

Carl D. Burkland, promoted to chief industrial engineer, **Wheeling Steel Corp.,** Wheeling, W. Va. **Chandler G. Lewis,** appointed assistant general manager, Wheeling Steel Corp.'s Martins Ferry, Ohio, factory.

Scott F. Burton, elected vice-president in charge of sales, **Rolled Steel Products Corp.,** Skokie, Ill.

John B. Prince, appointed sales representative, Los Angeles, steel strapping division, **The Stanley Works.**

Clark L. Burget, Jr., joined **Barnes Drill Co.,** Rockford, Ill., as sales engineer, Detroit sales office.

Roy M. Nelson, appointed Detroit sales representative for **Miles Machinery Co.,** Saginaw, Mich.

William J. Murray, heads the Ardmore, Pa., office, **Surface Combustion Corp. William M. Dempster** will manage the Syracuse, N. Y., office.

Cyril D. Oberg, named manager, aircraft and engine component sales, **Solar Aircraft Co.,** San Diego. **William F. Cords** becomes Mr. Oberg's assistant. **Kent M. Campbell** heads the new special product sales department.

George S. Forbes, appointed field manager, national industrial sales, **The Glidden Co.,** Cleveland.

Charles E. Meluney, Jr., appointed Houston district sales manager, Electrical Wire & Cable Div., **John A. Roebling's Sons Corp.**

Paul E. Beattie, appointed vice-president, and general manager, **O & M Machine Co., Inc.,** Los Angeles.

Ernest C. Hartmann and **Dr. Philip T. Stroup,** appointed assistant directors of research, **Aluminum Co. of America,** Pittsburgh.

John R. Hower, appointed vice-president, charge of sales, **Sterling Electric Motors, Inc.,** Los Angeles.

S. E. Johnson, Jr., elected assistant secretary, **The Cooper-Bessemer Corp.,** Mt. Vernon, O. **Dallas M. Marsh,** promoted to assistant foundry superintendent.

Hiram R. Winkle, appointed manager, industrial relations, **Copperweld Steel Co.,** Warren, O.

Dr. Myles L. Mace, named vice-president of **Litton Industries, Inc.,** Los Angeles.

C. J. Rowles, appointed executive vice-president and director, **Euclid Electric & Mfg. Co.,** Madison, O.

J. B. Sewell, elected vice-president, **Garlock Packing Co.,** Palmyra, N. Y.

Jack R. Hight, appointed manager of public relations, **Allegheny Ludlum Steel Corp.,** Pittsburgh.

Floyd T. Bowen and **James D. Ford,** appointed as assistant treasurers, **National Steel Corp.,** Pittsburgh. Mr. Bowen and Mr. Ford are executives of Weirton Steel Co., a National subsidiary.

F. G. HIGBEE, elected vice-president and director, Helical Tube Corp., Grand Rapids, Mich.

H. GEORGE De YOUNG, appointed executive vice-president, Atlas Steels Ltd., Welland, Ontario.

C. ALLEN DOLBY, named general sales manager, Brainard Steel Div., Sharon Steel Corp., Warren, O.

David L. Sutter, appointed director of forward planning, Defense Operations Div., **Chrysler Corp.,** Detroit.

Lloyd E. Williams, promoted to manager-distribution, **Cummins Engine Co., Inc.,** Columbus, Ind.

Wilton O. English, appointed works manager, Forging Div., **Phoenix Mfg. Co.,** Catasauqua, Pa.

Jerry Keefe, appointed sales promotion director, **Autopoint Co.,** a division of Cory Corp., Chicago.

Frank P. Glazebrook, appointed district manager, Newark, N. J., **Zurn Services, Inc.**

Menno Felber, appointed assistant manager of manufacturing, Industrial Power Div., **International Harvester Co.,** Chicago.

C. J. McGowan, appointed sales engineer, Standard Steel Works Div., **Baldwin - Lima - Hamilton Corp.,** western Pennsylvania and W. Va.

George P. Gardner, Jr., elected a member of the board of directors of **Barry Controls Inc.,** Watertown, Mass.

Gordon A. Sommer, heads the new department of research, **Clearing Machine Corp.,** division of U. S. Industries, Inc.

Theodore Kauffman, Jr., elected president, **S. Obermayer Co.,** Chicago, succeeding **Theodore Kauffman,** who becomes chairman of the board.

James R. Williams, promoted to Chicago district sales manager, **Signode Steel Strapping Co. C. Howard Carlson** becomes manager, sales promotion.

WILLIAM L. WALSH, appointed assistant to the president, Kennecott Copper Corp., New York.

L. R. GAIENNIE, elected vice-president—personnel, Fairbanks, Morse & Co., Chicago.

HARRY T. BURKE, appointed chief engineer, Hastinas Div., E. W. Bliss Co., Hastings, Mich.

EDGAR W. HUSEMANN, named chief metallurgist, Copperweld Steel Co., Warren, O.

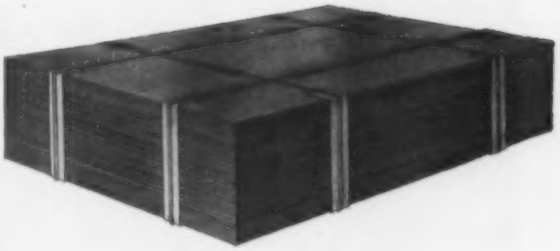
EASTON
A-1048
Platform Cars
Single and double-truck to any desired capacity
EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.
New York • Philadelphia • Pittsburgh

You'll find safety and savings in steel roof deck construction

Steel Roof decking has proved itself an outstanding material for industrial and commercial buildings. Strong, yet light in weight, steel roof decks are easy to apply and economical to maintain. They can be insulated to exact requirements . . . holding roof dead load to a minimum and permitting economy in the design of supporting structures.

The heavy demand for J&L sheet steel to be used in the manufacture of steel roof decks points up the growing acceptance for this method of construction. In addition, it provides evidence of the manufacturer's confidence in J&L's ability to furnish quality steel exactly to specification.

Whatever *your* product, whatever *your* requirements for formability, uniformity or drawing qualities, you can depend on J&L. You get the most out of your production equipment and add to the value of your finished products by using J&L sheet steel.



serving steel users everywhere—

J&L's nation-wide distribution is supported by its location and facilities for prompt, dependable river, rail and truck shipments.

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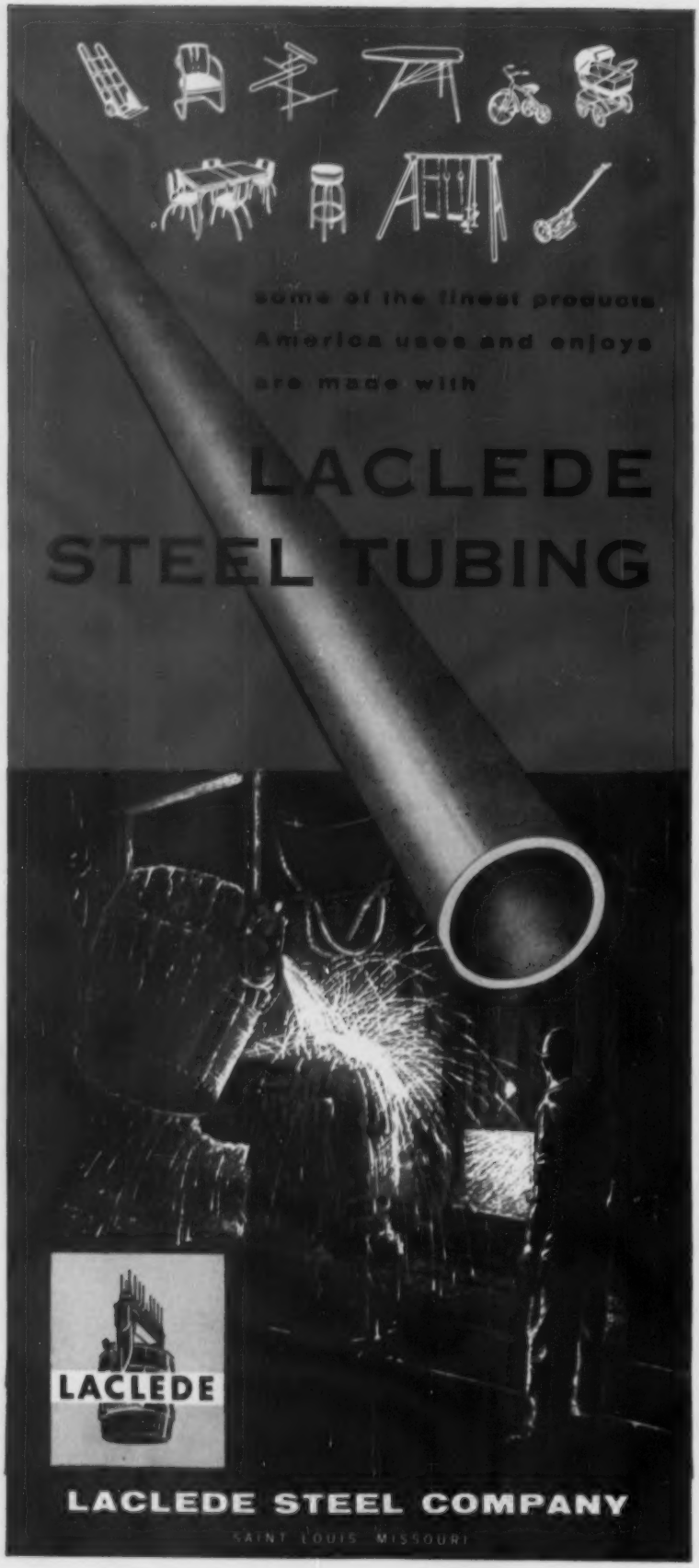
Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*



PERSONNEL

Stuart F. Hatch, appointed district manager, St. Louis, Spang-Chalfant Div., **National Supply Co.**

Patrick V. Gallagher, named chief engineer, Dwight-Lloyd Div., **McDowell Co., Inc.,** Cleveland.

Norman D. Rice, appointed manager of engineering, **Inland Steel Products Co.,** Milwaukee.

Eldon Johnson, joined the staff of **Barrymount Corp.,** Watertown, Mass.

Edward D. Flavin, appointed vice - president, **Johns - Manville Sales Corp.,** New York. Mr. Flavin was also named manager of special industries and industrial products division.

John J. McKeown, appointed manager, work order department, Milwaukee plant, **Joseph T. Ryerson & Son, Inc.**

Hamilton Goff, promoted to assistant to sales vice-president, **U. S. Steel Homes, Inc.,** New Albany, Ind.

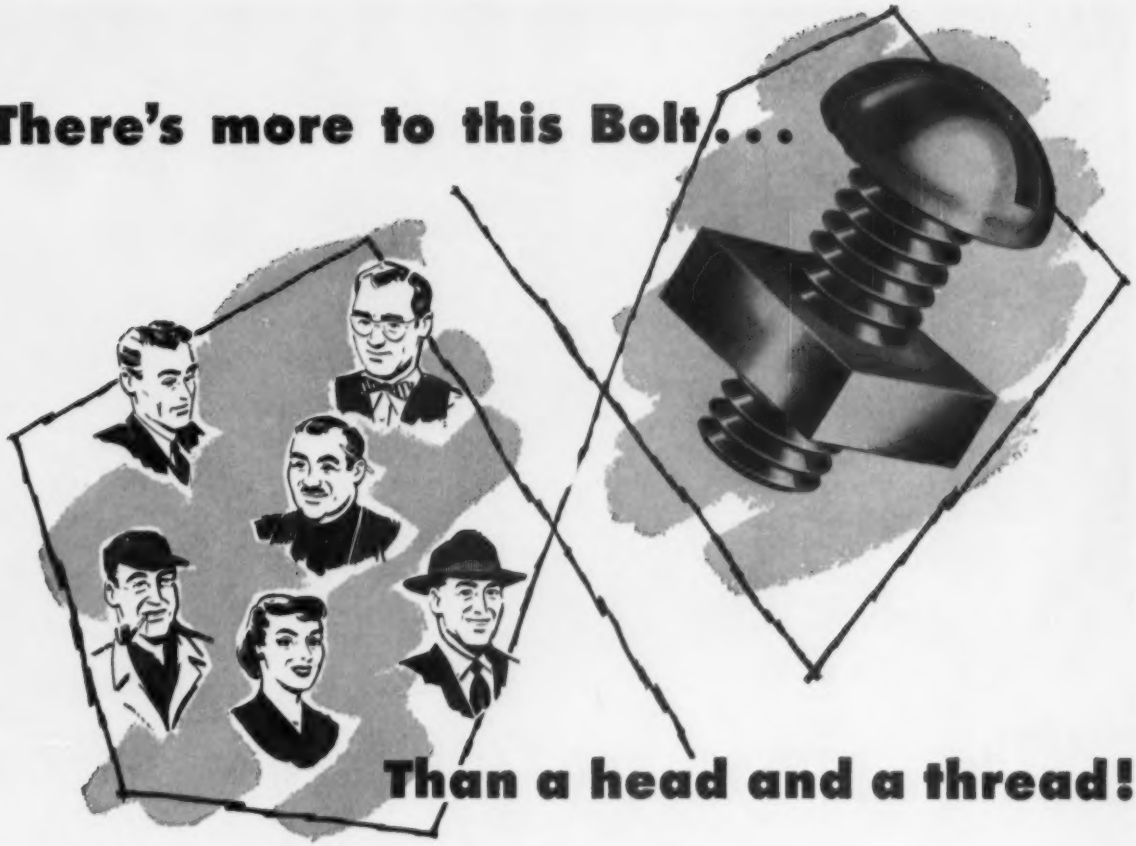
H. E. McPherson, appointed New York district sales manager, **Republic Steel Corp. Nelson E. Walker,** appointed Pittsburgh district manager.

James E. Butler, appointed Eastern division manager, industrial and hardware sales, Atkins Saw Div., **Borg-Warner Corp. W. H. Brace,** promoted to Northwest industrial division manager, Portland, Ore., and **W. M. Barber,** appointed industrial sales representative in Northern Oregon.

Robert Graham, appointed assistant superintendent, cold strip department, Midland Works, **Crucible Steel Co.** of America.

L. G. Hubbell, appointed manager, sales-order department, **A. M. Byers Co.,** Pittsburgh. **C. H. Flinn,** named assistant manager.

There's more to this Bolt...



Than a head and a thread!

Yes, there are many more things than meet the eye, even behind the most common type of bolt.

Such things as the *people* who engineer, manufacture, package, sell and ship these bolts.

Such things as the *pride* they take in turning out products that have a little extra something.

Such things as *skill* and *craftsmanship*, that are unseen but still noticed in the finished product.

Such things as *consideration* and *pleasure* in dealing with customers.

These, then, are the "plus" features behind every Lamson Fastener. The reasons why we are proud of our continued growth and our ability to meet your requirements for any fastener need.

Your Lamson & Sessions representative can show you how it is often possible to save time and money by using "Standard" Lamson fasteners. Or, when the situation calls for it . . . a Lamson Engineered "Special".

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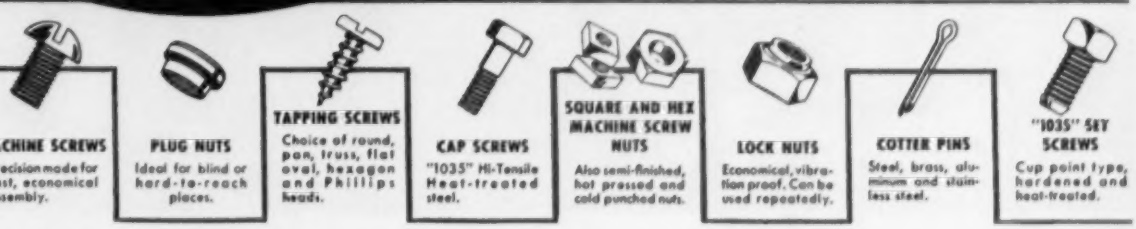


MACHINE SCREWS — Precision made for fast, economical assembly.

PLUG NUTS — Ideal for blind or hard-to-reach places.

TAPPING SCREWS — Choice of round, pan, truss, flat oval, hexagon and Phillips heads.

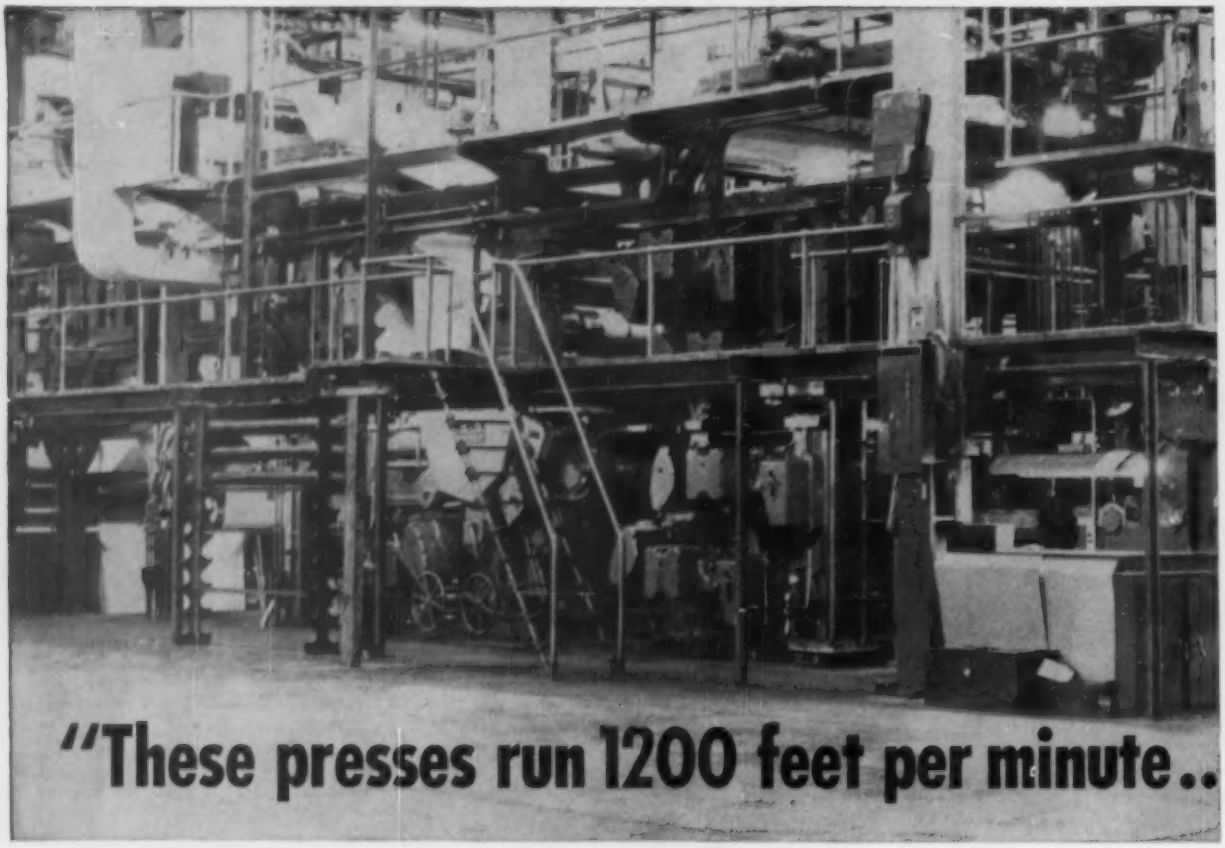
CAP SCREWS — "1035" Hi-Tensile Heat-treated steel.

SQUARE AND HEX MACHINE SCREW NUTS — Also semi-finished, hot pressed and cold punched nuts.

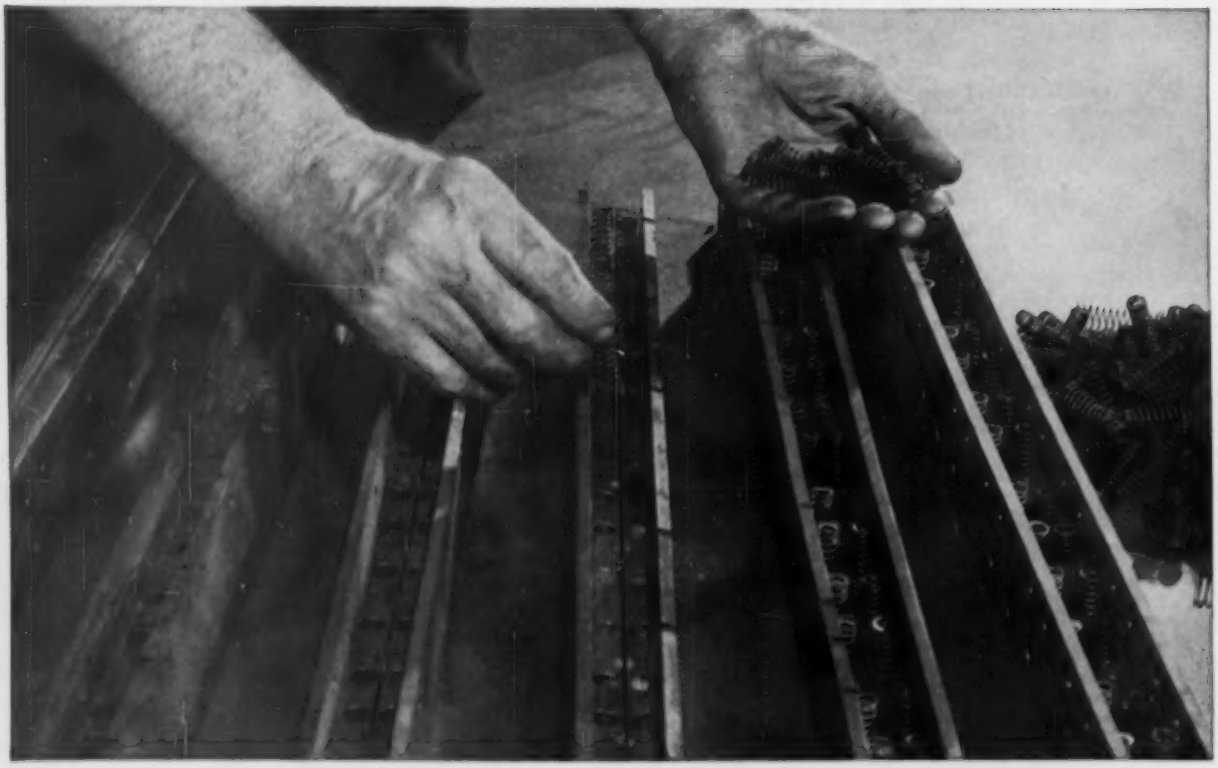
LOCK NUTS — Economical, vibration proof. Can be used repeatedly.

COTTER PINS — Steel, brass, aluminum and stainless steel.

"1035" SET SCREWS — Cup point type, hardened and heat-treated.



Cutting knife enters the slot visible in these knife assemblies. Springs maintain pressure on the paper during cut.



Here is a giant multicolor magazine press in action. Paper is cut 640 times per minute. Press speed: 1200 feet per minute.

so we need springs that can take it"

says Goss Printing Press Company, world's largest manufacturer of newspaper, magazine and rotogravure presses

● 74% of the world's daily newspapers are printed on Goss equipment. Some of the presses are nearly a city block long—giant, roaring machines that gobble up newsprint at the rate of 1200 to 2000 feet per minute. Many of the largest magazines also are printed on Goss presses, which run up to 1200 feet per minute.

At one end of the press is the cutting cylinder, where the paper is cut "on the run." 640 times a minute, the sharp steel knife snaps in and out between two spring loaded fibre "cushions" that hold the paper against the cutting cylinder. When the knife retracts, the springs push the cushions back out of the way.

According to Mr. William Zimmer, Asst. Chief Engineer, "Inferior springs would fail, jam the cutting cylinders, wedge the folding mechanism, and cause severe damage. I don't think that a spring could have a tougher job; but we've been using American Quality Springs for 20 years with excellent results."

American Quality Springs are available in any size, any quantity, any steel, style or finish—including flat wire and special shapes. Just get in touch with your American Steel & Wire representative.

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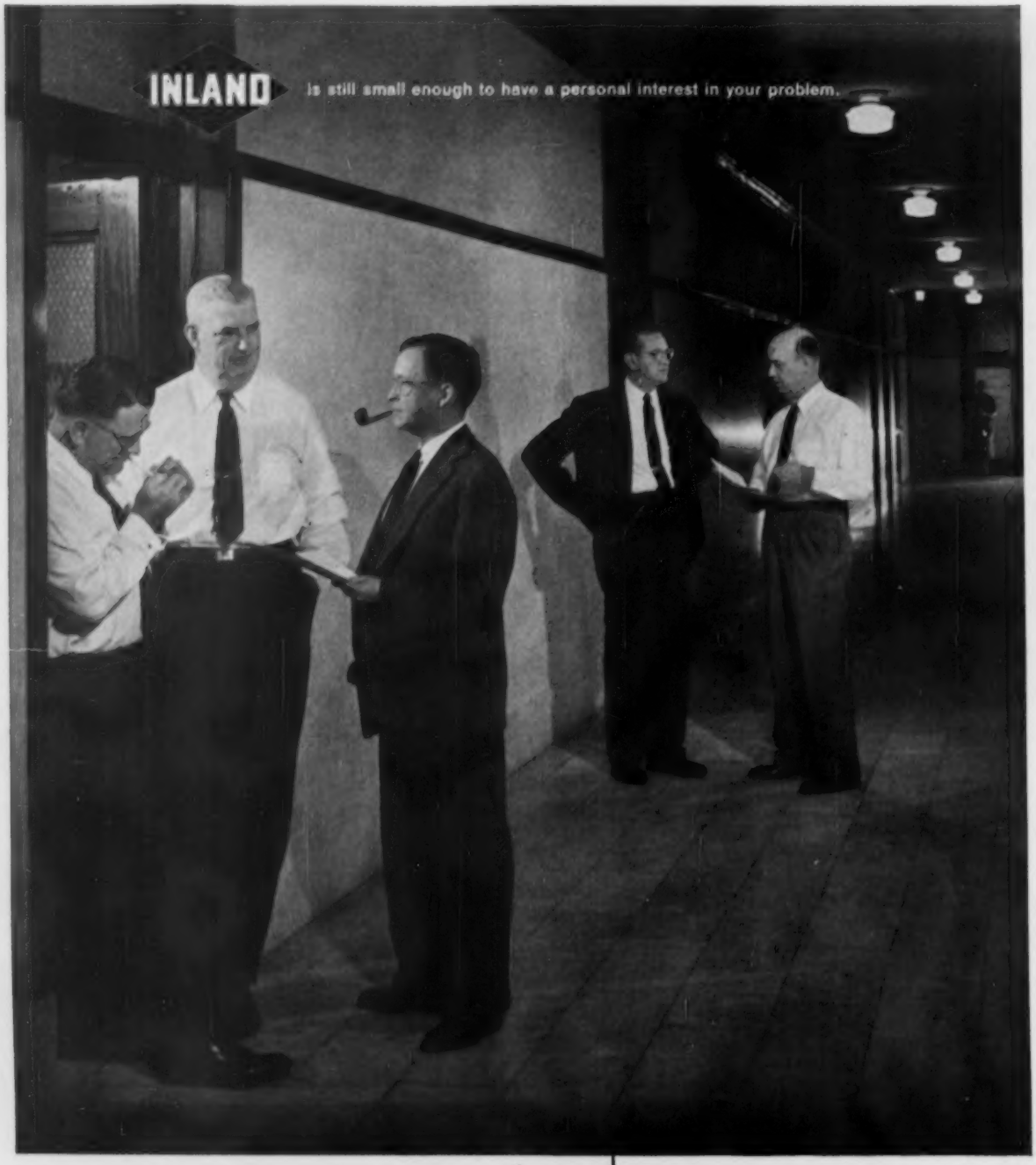
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS American Quality Springs USS

UNITED STATES STEEL



Why you can get quick action on steel-making questions at Inland

When your steel problem needs a prompt answer, you can get it at Inland where all the men who make decisions are quickly available. Like the top men in sales, steel manufacturing, quality control, raw materials and traffic pictured here.

INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois
Sales Offices: Chicago • Milwaukee • St. Paul
Davenport • St. Louis • Kansas City • Indianapolis
Detroit • New York
Principal Products: Sheets • Strip • Structural Shapes • Plates • Bars • Tin Mill Products • Rails and Track Accessories • Coal Chemicals

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

WELDING:
Solutions to Problems Outline Future Progress

◆ Welding's future will be tied in closely with four major fields: nuclear energy, automation, electronics and human engineering . . . It will be important in the first three, and benefit from the fourth.

◆ Submerged-arc welding of field erected tanks is an imaginative use of automation . . . Many combinations of dissimilar metals are being welded, and many more will be, with excellent results.

◆ Management's job will be to train welded design engineers . . . A fast means of evaluating weldability is another must.

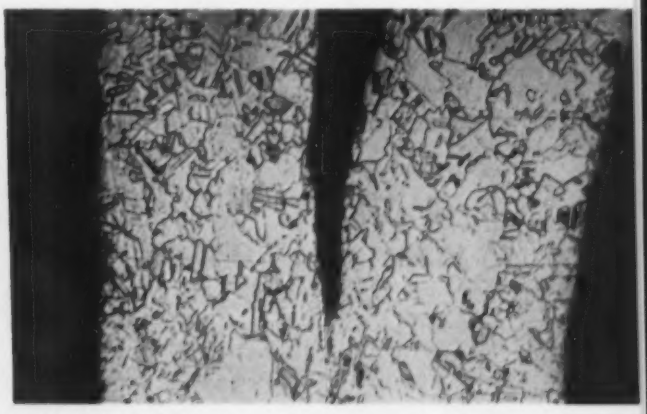
By O. T. BARNETT, Welding Research Supervisor,
Armour Research Foundation,
Illinois Institute of Technology, Chicago

◆ MORE RESEARCH emphasis will be placed on four fields in the immediate future: nuclear energy, automation, electronics and human engineering.[1] Future welding progress, brazing and soldering included, will play a more important part in the first three of these fields and will benefit from the fourth.

Nuclear energy developments involve the welding of zirconium, stainless steels, Monel metal and many other materials ranging from foil thicknesses to massive sections. In addition, many joints between dissimilar metals bring about welding problems of tremendous complexity.

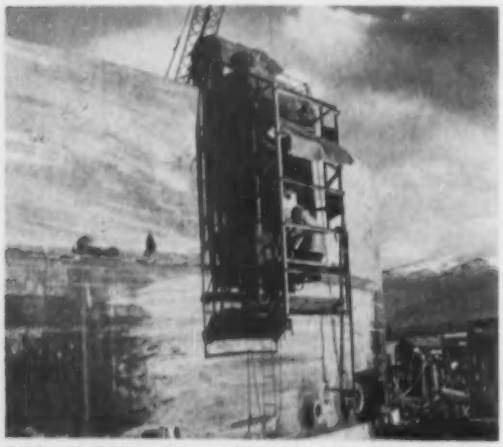
Automatic welding has been practiced for at least two decades although the adoption of automatic inert-gas welding has shown a striking acceleration recently. Furnace brazing

CO_2 BACKS ARGON as a shield for metal inert-gas welding at a gas saving of about 70 pct.



MICROGRAPH shows how aluminum is completely recrystallized after "cold" welding.

SHELL MOLDS replace lost wax process for preheatless thermit welding of reinforcing rods.



SUBMERGED ARC welding of girth seams on large storage tanks is forward step toward automation.

of complicated assemblies is another chapter in the story of automation.

Electronics challenge the ingenuity of welding engineers who may use condenser discharge welding to flash butt weld components no thicker than a red hair. Color television tube parts are tiny, complicated and numerous, requiring exasperating precision of assembly. Finished tube rejects have been dropping steadily from the ruinous 80 pct characteristic of early production runs. Glass-to-metal seals have been made by inert-gas welding, by brazing, by soldering and now by a glass joining technique using glass powder for the filler material.

Five typical urgent welding research problems were reviewed recently: (1) brittle fracture, (2) techniques of welding, (3) elongation, (4) reinforced openings and (5) aircraft problems.[3] If predictions are combined with these typical research problems, some definite clues to the future of welding can be observed. Also, developments of the recent past need reviewing because of the normal lag between invention and assimilation by industry.

Clad metals and solid forms of stainless steel and Monel metal are not only joined together in identical metal twins but also in every imaginable form of intermarriage. So far, stainless steel-Monel combinations do not appear to be weldable for atomic power plants. Clad metals are made by all methods from Hortonclad to surfacing by welding. They are joined by every established welding process as well as by new processes such as cone arc welding.

Today's Outlook on Welding . . .

- **Production roll bonding of aluminum may be forerunner for solid phase welding of other metals.**
- **Stranded wires offer limitless possibilities in alloy formulations.**
- **Argon backed up by CO_2 promises savings up to 70 pct in inert-gas costs.**
- **Titanium welding and brazing developments expand the use of this fast growing metal.**
- **Lightly coated wire, direct current straight polarity and argon shielding may have licked porosity in inert-gas welding of steel.**
- **Induction heating is becoming more popular for pressure welding.**
- **CO_2 has advanced as a shielding gas for consumable electrode inert-gas welding of steel with or without a flux-filled tubular filler metal.**
- **Nitrogen has promise for copper.**
- **Multiple wires speed submerged arc welding.**
- **Iron powder electrode type have grown from one to four within two years with volume approaching 10 pct of electrode consumption.**
- **Metal inert-gas cutting of nonferrous alloys has been announced.**
- **Constant potential power sources return to welding popularity for automatic welding.**
- **Flash butt welding of aluminum to copper is commercialized.**
- **Automatic welding of aluminum pipelines is now practical.**
- **Consumable insert for pipe welding overcomes a stubborn problem.**
- **Shell molds replace lost wax process in some thermit welding applications while the thermit mixture supplies enough heat to eliminate preheating.**

Examples of automation involving welding are almost legion. A good example is the use of induction heating to form small diameter tubing. Flat strip is roll formed, brought to welding heat, squeezed together and cut off at rates of speed exceeding 200 fpm.

Field assembly of several plate sections by submerged arc welding in erecting large storage tanks is a natural development. However, the use of this welding method for girth seams and later for vertical seams, is a most imaginative use of automation.[3] Costs are lowered while quality is more amenable to control when automatic precision replaces manual arc welding.

Another advantage is that fewer passes reduce residual shrinkage in a joint. Banding, indicative of inward movement of girth seams due to longitudinal shrinkage of multipass welds, disappears when two-pass submerged arc welding completes the joint. Stresses are better balanced, too, because the inside and outside are welded simultaneously.

Printed circuits eliminate soldering

Similarly the metal inert-gas welding of aluminum pipe in the field is another sign of oblivion for the nomad with the welding helmet.[4] This accomplishment must be a forerunner of the metal inert-gas welding of steel pipe lines where millions of dollars in labor costs may be saved.

Among the more notable developments in electronics is the increasing use of printed circuits to replace the dexterous young lady who thrust a soldering iron through a jungle of wires with rapier-like speed and accuracy.

Yet, new methods bring new problems. How can the solder be forced to wet more rapidly by powerful, but non-corrosive fluxes? What methods assure a good bond every time? Is solder fluidity or surface tension control or something else the preventative against bridging across adjacent conductors that are designed to be insulated from one another? From an economic point of view the cost reduction experts would like to see the smallest possible drop of solder left behind at the connections.

Brittle fracture reached almost epidemic proportions in welded ships.[5] While this led to an understandable sensitivity to the subject on the part of welding engineers, further research has eased the pressure on welding. Several million dollars have been spent in the last 10 years for research related to brittle fractures. As yet, no one can state positively how to avoid brittle failures, although knowledge in this field is growing rapidly.

Research replaces opinions

Perhaps the techniques of welding may be difficult to separate from the materials of welding. In the 1930's, an API-ASME bend test failure in 3½-pct nickel steel was traced to martensite formed in the heat-effected zone because adequate preheating was not maintained. The test plate had been stress-relieved but this tempering did not prevent a brittle failure. Normalizing restored ductile behavior. In this case, preheating was more important than stress relieving.

Preheating is sometimes less important than other common welding variables. Heat input, joint design and cooling rates due to mass of parent metal in steel castings for railroad structures are much more important than preheating when the ambient temperature drops slightly.[6]

Large field-erected vessels cannot be stress-relieved as a whole and may be stress-relieved in sections only at great cost. Is stress-relieving necessary at all? If a manual weld contains 32 beads for a 16 pass weld in 2-in. mild steel and an automatic weld contains 16 beads for the same joint, does either or both welds need stress-relief? No one really knows. The future of welding is closely associated with research to replace opinions with facts about preheating and stress-relieving.

Stainless steels still present welding difficulties. Type 347 stainless has been used for

Brazing . . .

- **Flux and filler metals for titanium are accepted.**
- **High-temperature alloy furnace brazing of thin materials for jet engines shows promise.**
- **Flux for brazing aluminum bronze is developed.**
- **Brazing of metals to glass and ceramics continues to grow.**
- **Ultra-thin joints for super strengths are revealed.**

and Soldering

- **Ultrasonic cleaning of aluminum for soldering exhibits practical ingenuity.**
- **Special solders developed for electrodeposited zinc.**
- **Dip soldering fluxes and solders speed automation of electronics through printed circuits.**

power piping and turbines. Sometimes cracks develop. Why? No one is sure, although a great deal of research is in progress.

Higher stainless alloys, such as Type 330 used for heat treating furnace parts, sometimes fail by cracking in certain combinations of stress, temperature and atmosphere. Studies to learn why are also under way.

Dissimilar metal welding is often accomplished with excellent results as in the flash butt welding of aluminum to copper.[7] But copper-nickel to stainless steel joints cannot be made for certain severe temperature cycling requirements. Each year finds new additions to the list of weldable combinations of dissimilar metals. The future promises many more.

While miles of welds are subjected to x-ray examination daily with most pressure vessel manufacturers reaching quality levels of a fraction of 1 pct cutouts due to any cause. Should it be cut out? Many experts claim that the stress damage caused by repairing the weld brings about a less desirable structure than if the slight porosity had been left undisturbed. To what degree does porosity affect impact strength, creep strength, tensile and yield strengths, elongation, reduction of area or temperature cycling and fatigue response?

Code bodies are becoming more and more aware of these matters.[8] For instance, the wording in the 1952 ASME Unfired Pressure Vessel Code is: "Porosity is not a factor in the acceptability of welds not required to be completely radiographed." Research can be expected to provide a factual evaluation of weld porosity.

Elongation is another area where specification requirements are not keyed to scientifically proved needs. Rather, specifications are written around the highest elongation figures that weld metal can produce regardless of performance requirements.

Elongation valves a big question mark

Crimes are committeed in the name of quality when elongation is considered. E6020 electrode deposits, as welded, are required to produce all weld metal elongations of 25 pct minimum. An executive of an electrode producing firm remarked casually to a vice-president of a customer firm that he could expect at least 35 pct elongation. The vice-president learned that his welding engineer was obtaining only 29 to 31 pct. The welding engineer made many tests in a futile effort to get better values, but no one involved knew whether or not the battle was worth winning.

Reinforced openings represent another welding design area where experience has taught some lessons. Liberty ships with severe notches in hatch corners, when compared to Victory ships with a better stress accommodation in these areas, showed about a 200 to 1 difference in hatch corner fractures. Openings present complications that are difficult to calculate. Most welded reinforced openings perform well but may be overdesigned.

Designers probably know more about welding than welding engineers know about design. In the future, management must train welded design engineers. Able welded design engineers will be the key men of the welding future. They will call for the least weld metal exactly where it is needed to meet design requirements in a sequence that will eliminate the need for costly strongbacks and jigs to control alignments.

Faster evaluation needed

How is the weldability of new high-temperature alloys evaluated? Usually, gradual development of pioneering metals permits an "experience is the best teacher" sort of trial-and-error learning of welding response. But the urgency of keeping ahead of a potentially trigger-happy enemy in air developments does not permit the luxury of learning slowly. A rapid means for assessing weldability is a must.

Sandwich construction promises a remarkable strength-weight ratio. With stainless steel components, the 600°F and higher skin temperatures of supersonic aircraft can be accommodated. Cells of the sandwich honeycomb must be joined to each other and to the skin. Brazing techniques are being developed for this application.

Resistance welding from spot to flash butt welding is being hampered somewhat by the lack of good nondestructive tests. The extremely high quality control levels of aircraft construction do not permit any doubt about a weld. Therefore, better nondestructive test procedures are expected to accelerate the resistance welding of primary aircraft structures.

Ferrous alloys for aircraft are heat treated in the 150,000 to 200,000 psi ultimate strength range. Filler metals, both arc welding electrodes and bare wire for inert-gas welding, are undergoing research to match the heat treating response of the base metals. Steels such as SAE 4130, 4140 and 4340 require filler metals of metallurgical similarity even though chemistry may differ.

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New Materials Developments, Uses Highlight Western Metal Show

♦ New developments in die materials, titanium, high strength steels and nondestructive testing were among the many important topics discussed at the Ninth Western Metal Congress and Exposition.

♦ Up-to-the-minute reports on progress in metals and metallurgy were given by 106 speakers . . . Over 360 exhibitors pitched in to show the latest in machinery, processes, systems and methods.

By R. R. KAY, West Coast Editor

♦ PRODUCE it faster, with higher quality, at less cost! The American Society for Metals' Ninth Western Metal Exposition and Congress in Los Angeles aimed to show how to do it.

For five very active, well-attended days, March 28 to April 1, 24 technical societies and over 360 exhibitors pitched in to show and discuss the latest in machinery, processes, systems, and methods.

Emphasis was on aircraft manufacture. 106 speakers—27 from the West Coast aircraft industry — gave up-to-the-minute information from their plants.

Western metalworking executives, engineers, and metallurgists heard some of the top men discuss these important subjects:

New developments in die materials and forming methods . . . Titanium . . . New metals for the petroleum industry . . . High-strength steels . . . Heat treating of titanium, magnesium, and aluminum . . . Metals for the electronics industry . . . Powder metallurgy.

New developments in welding for heavy industry, aircraft, and rockets . . . New developments in non-destructive testing . . .New engineering applications for foundry products . . . One complete session was devoted to titanium problems and opportunities.

At the Pan-Pacific Auditorium every available inch of display space was crammed with the latest in metals, metalworking machinery, equipment for welding, heat treating, inspection, forming, and testing. ASM's national secretary and managing director, William H. Eisenman, can well be proud of this Show, one of the finest ever held in the West. The next Western Metal Exposition and Congress is scheduled for Los Angeles in March 1957.

Dr. George A. Roberts, president, ASM, and vice-president-technology of Vanadium-Alloys Steel Co., Latrobe, Pa., told THE IRON AGE the metalworking industry right now needs 4000 to 5000 engineers. Yet next June, only half that number will graduate.

Leading the discussion on titanium, Walter L. Finlay, vice-president and director of research, Rem-Cru Titanium, Inc., Midland, Pa., said, "Technical difficulties—notably hydrogen embrittlement and cracking during fabrication and after assembly—were serious during 1954,

"Bronzes, tool steels and various cast iron alloys are improving tooling efficiency . . ."

but excellent progress has been made in correcting these problems."

Heat treated, high-strength steels are challenging titanium alloys for strength-weight supremacy even in the medium range of 300°F to 900°F, once thought to be titanium's special province.

Heat treatment of certain existing titanium alloys is now reaching the production stage, notably in aircraft bolts.

Ultimate strengths in the 160,000 psi to 180,000 psi range appear feasible, and even higher strengths are in reasonable prospect.

"The higher quality and good properties of present alloys plus the good higher strength alloys now in laboratory and pilot production stages insure a firm tonnage position for titanium in the aircraft field," Mr. Finlay reported.

Metal engineers are embarked on two new fields of research to establish wider use of titanium, according to R. I. Jaffee, division chief, nonferrous physical metallurgy, Battelle Memorial Institute, Columbus, O. He said that equilibrium conditions for titanium alloys have been well established during the past five years. "The major attention of physical metallurgists now is on the kinetics of the processes through which titanium alloys attain equilibrium."

"A second major field of activity," Mr. Jaffee noted, "is concerned with quality factors, including effects of interstitials, low temperature embrittlement, notch sensitivity, and strain rate."

Aircraft manufacturing today needs manufacturing and tooling flexibility to insure economy, production efficiency, and the all-important requirement of meeting manufacturing schedules.

Introduction of new metals, such as titanium and high temperature steels, constantly present tooling problems, Frank J. Pesak, senior production design engineer, North American Aviation, Inc., Los Angeles, said.

Better tooling materials

New tooling materials in many cases or new combinations of the more familiar tooling materials are being used to good advantage. Metals of the bronze group, tool steels, and various cast iron alloys, are used in different combinations to improve tooling efficiency.

However, zinc-based alloys are the mainstay in aircraft manufacture tooling.

Many new materials are coming into use for

METALWORKING executives and engineers turn out in force for the Ninth Western Metal Show.

oil field equipment. E. F. Green, chief metallurgist, Axelson Mfg. Co., Los Angeles, Div. of U. S. Industries, Inc., told the meeting: "Hardenable Ni-Resist cast iron and ductile iron pump liners are on test in the oil fields. Carbide valve seats and balls are finding ever-increasing use, because of high corrosion and abrasion resistance. Electroless nickel plating is being tested on pump fittings for resistance to hydrogen sulphide and salt water corrosion. H steels are beginning to be used for high strength sucker rods."

And there's increasing demand for higher strength steels in the production division of the petroleum industry, according to C. L. Clark, metallurgical engineer, special steel developments, Timken Roller Bearing Co.'s steel and tube division, Canton, O. Greater depth of many wells and higher pressures encountered are behind the increased demand.

Phenomenon of delayed failure in steel definitely has been correlated with the presence of hydrogen. Nature of the failure has much in common with fatigue failure. "Principal difference," says Dr. Alexander R. Troiano, head, department of metallurgical engineering, Case Institute of Technology, Cleveland, "is that a large number of alternately applied stresses may not be necessary."

"Delayed failure," he pointed out, "may occur over a wide range of relatively low applied stresses depending upon strength level, notch acuity, and aging time after introduction of hydrogen."

Heat treated 4130 steel is being welded on a production line in 5/16-in. thickness to develop a 100 pct joint efficiency by using automatic submerged arc welding. This report came from B. Roberts, welding and metallurgical laboratory supervisor, and W. A. Saylor, chief metallurgist, Consolidated Western Steel, Los Angeles, Div. of U. S. Steel Corp., in their paper, "A Look at the Automatic Welding of High Strength Steels." They said USS T-1 steel can be automatically submerged arc welded to produce a 100 pct joint efficiency in the 100,000 psi yield strength classification.

Submerged arc for 4140

For the 100,000 to 200,000 yield strength classification their study shows that 4140 and 4340 can also be automatic submerged arc welded, producing weld deposits similar to the plate analysis other than carbon. However, the higher alloy content coupled with the lower carbon produces very encouraging results upon heat treatment.

Dr. Arthur E. Middleton, head, physics and physical chemistry department, P. R. Mallory & Co., Inc., Indianapolis, said at a session on electronics that developments of capacitive materials are proceeding in two directions. These are to produce thinner films with high dielectric strength and to synthesize ceramic structures with high dielectric constants over a broad temperature range.

Industry is becoming more and more dependent on non-destructive testing to reduce costs, upgrade quality, and increase safety.

Through use of non-destructive devices, industry now is able to stock raw material and be sure it will produce the parts needed on time, with these parts meeting exact requirements of specifications governing quality of the material. This came from William C. Hitt, national president, Society for Nondestructive Testing, and assistant chief, quality control, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Ultrasonic tests important

Ultrasonics is an important inspection tool since it is the only common nondestructive method available for detecting internal defects typical in large fabricated parts. R. E. Kleint, research engineer, production development laboratory, North American Aviation, Inc., Los Angeles, pointed out, "Limitations as well as applications must be acknowledged when contemplating ultrasonic flaw detection. It is particularly applicable to aluminum and steel, and thicknesses of several feet may be inspected.

"However, thicknesses less than ¼ in., concave surfaces with a radius of less than two inches, and convex surfaces with a radius of less than one inch are difficult to inspect."

Mr. Kleint added, "Adequate material handling equipment is an important part of an ultrasonic inspection installation. Automatic mechanically-powered traversing mechanisms are desirable only when inspecting large quantities of symmetrically-shaped material such as plate or rectangular billet stock."

Why heat the whole piece? That's a question one may well ask when considering a heating method and application for surface hardening or brazing. So says Dr. H. B. Osborn, Jr., technical director, Tocco Div. of Ohio Crankshaft Co., Cleveland.

Production of wear-resistant surfaces on large parts by conventional methods would necessitate heating the entire part for quenching and drawing or carburizing and hardening and drawing. "With induction heating," Dr. Osborn says, "almost complete machining can be done before processing and costly pretreatments are eliminated, as are straightening operations.

"In brazing, application of heat to only the desired areas permits retention of the physical properties of the balance of the assembly and eliminates the scale and the distortion which would result from complete heating.

"It costs more to heat with electricity than with gas or other types of fuel. However, high production, improved quality, and many other economies throw the balance in favor of induction heating," Dr. Osborn said.

By 60 pct—

Dual Tooling Boosts Screw Machine Output

◆ A tooling change on multiple-spindle automatics boosted bearing race output 60 pct . . . Machines now make two races per cycle instead of just one.

◆ Crane delivers bar stock to machine loading racks to keep shop aisles clear, save operator's time and effort . . . Padded stock tubes run quietly.

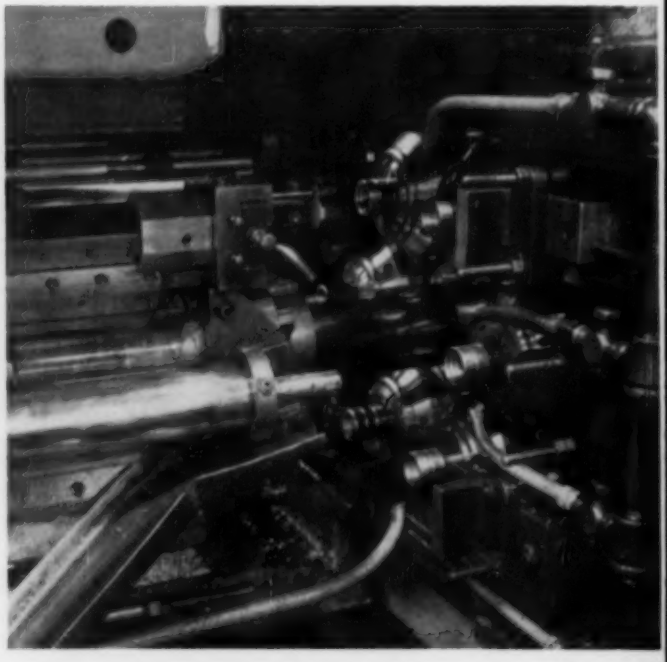
By H. C. LARSON
Supt., Screw Machine Mfg.
West Pullman Works
International Harvester Co.
Chicago

◆ ALTHOUGH MULTIPLE-SPINDLE screw machines are inherently efficient at turning out prodigious quantities of parts, the use of forethought and ingenuity can often increase output still more without any sacrifice in part quality. This search for a "better way" is habitual in the screw machine department of International Harvester Co.'s West Pullman Works in Chicago.

Among the departmental products manufactured in large volume are inner and outer ball bearing races made from E 52100 seamless steel tubing. The shop's multiple-spindle machines formerly produced one race per cycle, but by altering the tooling so that the same machines make two races per cycle, production has been increased by an average of about 60 pct.

Output could not actually be doubled because for most race sizes the new tooling demanded heavier cuts and spindle speeds about 35 pct lower than the one-piece-per-cycle method. But the average 60 pct production gain is still impressive considering that it was attained with only the nominal cost of dual as compared with single tooling, and also without adding new machines.

The single tooling technique involved finish forming the race outer diameter at the No. 1 station, boring and a breakdown on the outer diameter at the No. 2 station; reaming and facing at No. 3 station; necking with a cross-slide tool at station No. 4; cut off at station No. 5; rough boring and rough forming at the No. 6 station. Spindle speed for one popular



Right: SIX-spindle automatic now tooled to produce two outer bearing races per machine cycle.

size race made by this method was 116 rpm for a maximum cutting speed of 88 sfm. Cycle time per piece was 29.3 seconds.

With the new method, two races are finish formed and finish bored simultaneously at the No. 1 station. The No. 2 station faces and necks the outer race only. Tooling at the No. 3 station cuts off the outer race. The second or inner race is then faced and necked at station No. 4 and cut off at station No. 5 At the last station, bar stock feeds out and is rough formed and rough bored before going to the No. 1 station to repeat the cycle.

Output was doubled

When the new tooling was applied to the popular size race previously mentioned, the machine had sufficient capacity to permit increasing spindle speed to 126 rpm. By cutting at a maximum speed of 95.5 sfm, the cycle time for two races was reduced to 29 seconds and output was slightly more than doubled.

But on most other race sizes, where machines were already close to maximum capacity with the single setup, spindle speed had to be reduced for double tooling. On the whole, the changeover produced an average 60 pct increase in bearing race production. In all cases the new system holds the same dimensional limits as the former method and there is no sacrifice in part quality.

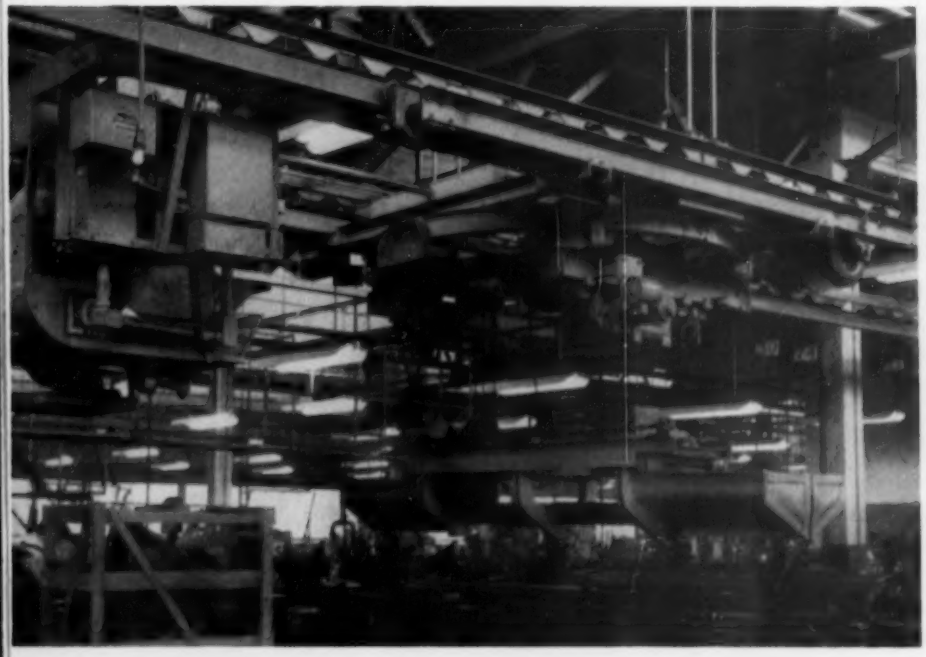
Equivalent production gains have also been achieved on inner races which involve similar screw machine operations. All the tools for making these bearing races are high speed steel, chiefly M2 and M3 grades.

Because this department operates 75 multiple-spindle screw machines, 108 single-spindle machines and 10 hand screw machines, efficient facilities are essential for keeping machines supplied with stock. It is also desirable to minimize noise caused by stock rotating in feed tubes, otherwise the clatter would be deafening. Both of these conditions are well met.

Bar stock is stored in racks at some distance from the machines and is issued on order. Each stock bundle destined for a particular machine is placed in a scale cradle. A Louden overhead crane, equipped with a bar handling attachment, picks up the stock bundle. Bars are then carried parallel to the crane rails down the aisles that separate the stock racks for the various machines. At point of delivery, the load is shifted transversely and lowered into the rack.

Each stock rack is positioned so that a machine operator can push one bar at a time into his machine without any lifting or assistance. Aisles are not encumbered by trucks or bundles of bar stock.

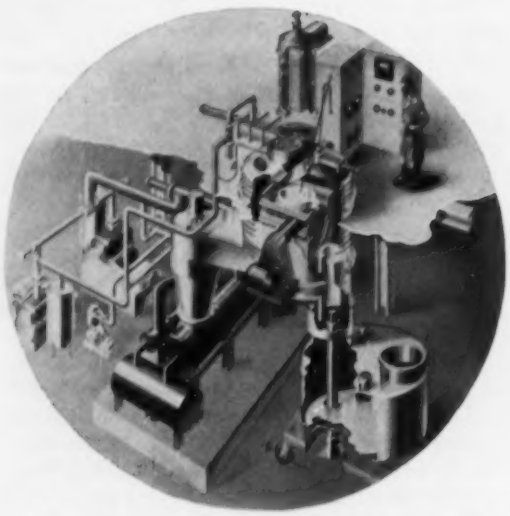
Because stock-holder diameters must be larger than the bar stock and because the latter is not always straight, fast rotating bars will strike the holder walls. This noise can be deadened by making the holders nonresonant. To solve this problem the shop tried some double-wall, half-tube type holders with fibrous lagging between the two walls. With this arrangement, bars rotate with only a slight noise, even when not straight.



Left: CRANES move bar stock to racks adjoining machines for quick, effortless machine loading.

Vacuum Furnace Capacity Easily Expanded With Modular Units

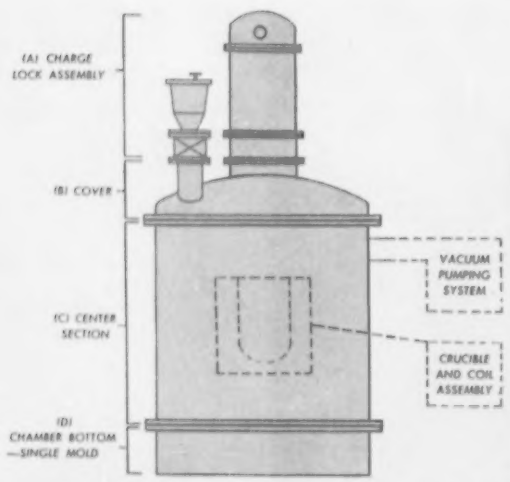
By R. G. Ulrech, Chief Metallurgical Engineer, Consolidated Vacuum Corp., Rochester, N. Y.



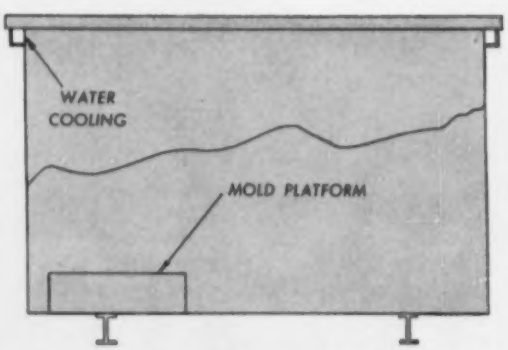
MODULAR DESIGN furnace for vacuum melting and casting has a 1000-lb capacity. Construction of such a furnace for semicontinuous operation is now very near to completion.

◆ As vacuum metallurgy develops rapidly, the problem of plants interested in the process is how much money to invest . . . Small batch equipment could be outmoded quickly . . . Future production is assured by designing facilities which can be expanded.

◆ Modular type vacuum furnace equipment can simplify the transition from pilot to full-scale production of vacuum melted metals . . . Flexibility and provision for expansion are primary considerations in design.



CROSS-SECTION shows typical design of 1000-lb vacuum melting and casting furnace. Section C accommodates maximum crucible capacity. Sections A, B and D provide for changes to greater capacity or different techniques.



VARIOUS CHAMBER BOTTOMS (Left to Right:) with accessory equipment allows production of single ingots, multiple shaped castings or centrifugal castings from same furnace. Change from one bottom to another takes a few hours.

◆ VACUUM METALLURGY has developed rapidly in the past 5 years. In 1950, 50-lb batch type melts were extraordinary. Today, 1000-lb melts are becoming common. Engineers, planning ahead, are talking of, and designing for, 10,000-lb melts and continuous operation.

Development of high-vacuum technology has been equally rapid. Before World War II, pressures below about 1/100th of atmospheric pressure were achieved in vacuum furnaces only in laboratory procedures on a very small scale. Now, 1000-lb vacuum furnaces operate regularly in the range of a millionth of atmospheric pressure, and engineers are exploring still lower pressures.

The virtual certainty of speedy growth of high-vacuum metallurgy, and the accompanying possibility of quick obsolescence of equipment, creates some serious problems for the metal industries. Vacuum furnaces and auxiliary equipment designed to meet only today's needs may be inadequate tomorrow. On the other hand, over-designing equipment in excess of current needs could be prohibitive cost-wise.

High-vacuum furnaces with sufficient capacity for current requirements and capable of being considerably expanded in capacity at relatively low cost may offer a solution to this problem.

In view of the relatively small cost involved in designing and building such flexibility into the vacuum furnace initially, as compared with the large investment required to duplicate or enlarge an inflexible installation, it would seem wise to make very feasible provision for expansion of the system, and for adapting it to different techniques.

This can best be accomplished by designing the furnace in "building blocks" or modular units. In designing a modular type unit for maximum flexibility, there are several major considerations: First, the permanent center section of the vacuum chamber should be designed for maximum crucible capacity.

Second, permanent auxiliary equipment such as the vacuum pumping system, should be attached to the center section. Provisions should be made for subsequent attachment of additional auxiliary equipment as it is needed.

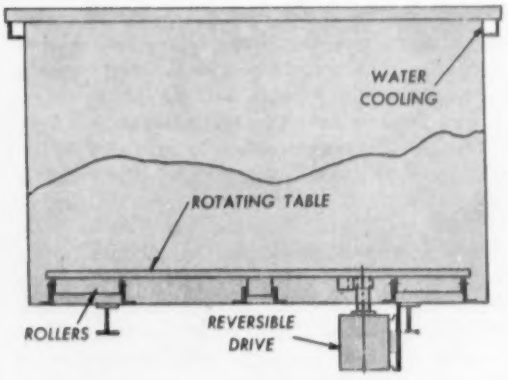
Third, those parts of the furnace that would have to be changed to provide greater capacity, or to allow use of different melting or casting techniques, should be designed so they can be changed easily, with least downtime and at minimum expense.

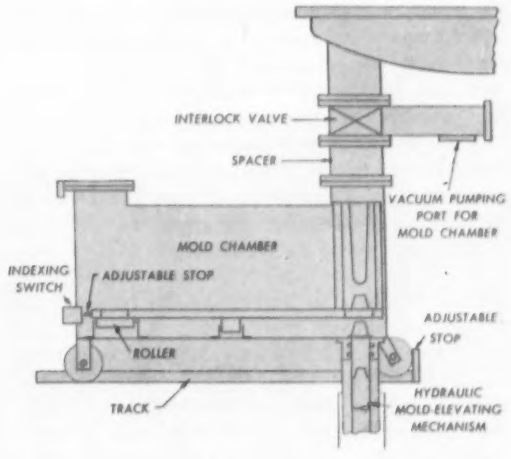
Provide for larger capacities

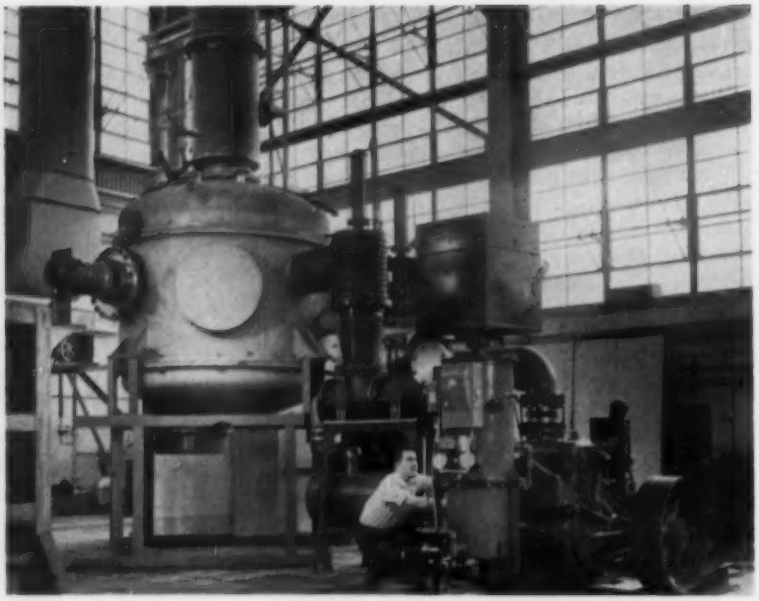
A company planning to undertake vacuum melting might plan initial pilot operations on a basis of 350-lb batch melts. Later, this might be scaled up by a factor of two or three times for production runs.

Flexibility desirable for such an installation is easily achieved with a furnace having the vacuum chamber on a vertical axis, with vacuum pumps, gages, and other permanent auxiliary equipment attached to this main or central section of the chamber. Crucible, molds, and top and bottom chamber sections should be interchangeable, and should be readily attached and detached, to provide economical expansion to larger capacities, or to adapt to different melting or pouring techniques.

In a typical installation, a 350-lb furnace would require a vacuum chamber at least 6 ft in diameter. However, if this chamber is increased to 7 ft in diameter it would then provide ample capacity for a 1000-lb crucible. The







VACUUM FURNACE, designed on modular principle, will first handle 350-lb melts. Later, capacity can be increased to 1000 lb, and addition of auxiliary equipment will make it possible to convert to semicontinuous operation.

added cost, in proportion to the total investment would be relatively small—basically, only the cost of the additional material.

It would be necessary, of course, to provide supports, trunnions, hoists, and some other facilities of adequate capacity for the larger operation. However these, too, could be built in initially at a small fraction of the cost that would be required to add or enlarge them later.

Standardize design

Required capacity of the vacuum pumping system varies, depending on the materials being melted, and the operating procedure. For many furnaces of 350-lb capacity, a 16-in. diffusion-ejector pump having a throughput of 40,000 micron-liters per second at a pressure of 10 microns (Hg), or 2500 micron-liters per second at 1 micron, appears to be adequate.

Such a pump will maintain ultimate pressures in the range of 1 to 10 microns required for a gas-free atmosphere. It also provides ample pumping capacity for handling pressure surges, such as those which occur during alloy addition and pouring, with sufficient ease to return the chamber quickly to the required operating pressure.

To increase the capacity of a furnace from 350 to 1000 lb would probably require the addition of one vacuum pump of like capacity. However, this modular type of furnace now is being made in terms of a standard design with ports or flanges to accommodate a total of three vacuum pumps as a part of the original construction to provide sufficient vacuum pumping capacity for a variety of applications. Where any of these ports are not to be used initially, they are blanked off with steel plates which can be cut out easily to add another pump.

Flexibility of casting techniques is provided by interchangeable bottoms for the vacuum chamber. This removable bottom facilitates cleaning, simplifies repairs in the event of spill-outs, and makes it possible to institute alternative casting methods as desired.

By providing various chamber bottoms with suitable accessory equipment, single ingots, multiple shaped castings, or centrifugal castings can be produced from the same furnace. Downtime for changing from one bottom to another should not be more than a few hours.

Interchangeable chamber tops can also increase flexibility. However, a single top providing an alloying turret, bridge-breaking mechanism, and the proper openings or connections for pyrometers or other instruments, normally would provide all the facilities required for a variety of applications.

Semicontinuous operation is provided by installing interlocks through which the crucible can be charged, the alloying elements can be altered or adjusted, and the ingots or castings removed, without breaking the vacuum in the main chamber. Since these interlocks are accessories for both the top and bottom assemblies, they can be added to the system at any time by initially providing suitable flanges on the top and bottom sections. In most applications, additional roughing pumps are required to evacuate the interlocks to a pressure low enough so that they can be opened to the main vacuum chamber.

Properties compared—

How Chromium Steels Rate for High-Temperature Aircraft Service

Part II

◆ High temperature operating problems arising from the kinetic heating of high speed aircraft have posed major problems for materials engineers . . . Because of their excellent properties at high temperatures, chromium alloy steels may be used to advantage in many applications.

◆ Two alloys, Halcomb 218 and Chro-Mow present an unusual combination of strength and ductility at temperatures as high as 1100°F . . . In the range from 300° to 1100°F, these alloys offer superior strength-density ratios . . . High alloy hot work steels have been used successfully where working surface temperatures are over 1000°F.

By E. A. LORIA, Staff Metallurgist, Crucible Steel Co. of America, Pittsburgh

◆ THE ADVENT of high speed aircraft has produced problems of strength of materials at elevated temperatures due to kinetic heating. On the basis of strength-density ratios for various temperatures, stainless steels have gained major consideration in a possible solution to these problems.

Properly protected non-stainless steels, however, may also meet the requirements. For example, low alloy sheet materials are being used successfully in aircraft turbine engines. The properties of this class of alloy steels, broadly designated as 1.0 pct Cr-Mo-V with 0.2 pct C, over the lower operating temperatures for such engines, are shown in Fig. 1.

In such steels, short time yield strength seems to be the limiting property up to 950°F, whereas at higher temperatures 1000 hour rupture strength becomes the design criterion. A material whose minimum yield strength or rupture strength matches or exceeds the desired curve is satisfactory, as long as it has commensurate creep and fatigue strengths.

High alloy hot work steels have been used

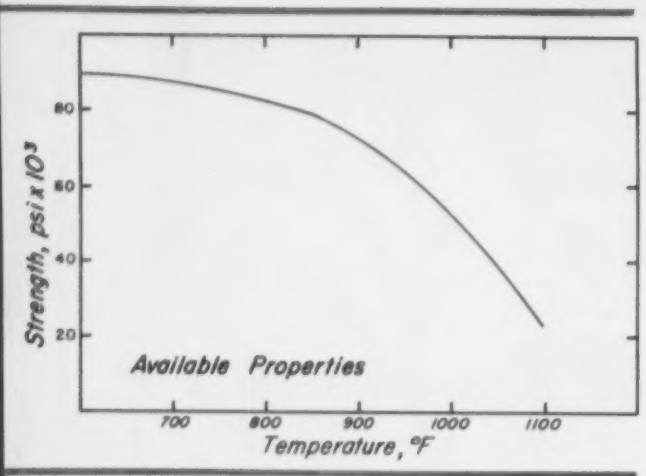


FIG. 1—Stress-temperature relation for low alloy aircraft sheet, broadly designated as 1 pct Cr-Mo-V steel with 0.2 pct C.

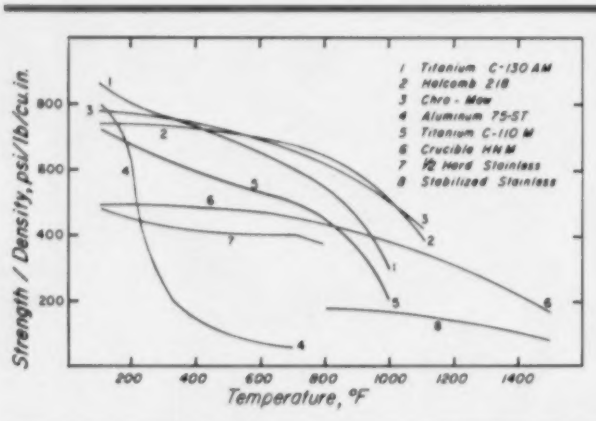
successfully for many applications where the steel at the working surface is in service at temperatures over 1000°F. Steel of 5 pct chromium, with around 0.35 pct carbon and small amounts of molybdenum, vanadium and tungsten has been satisfactory for many applications where high temperature strength and toughness were requisite. Under survey for aircraft structures will be two such grades (5 Cr-Mo-V and 5 Cr-W-Mo) known commercially as Halcomb 218 and Chro-Mow. Analyses of these steels are shown in Table I.

The suitability of these chromium steels has been studied by Payson and Nehrenberg.[1] Their excellent expansion properties are very similar to those of titanium and ferritic stainless. Coefficients of expansion, Table II, are practically independent of the condition of the steel and both have about the same values. Large operating temperature differentials during flight will produce large thermal expansion which must be controlled or allowed for in aircraft design. The low values for these hot work steels in comparison to those of the austenitic stainless grades is noteworthy.

Halcomb 218 and Cro-Mow were selected for aircraft sheet and forged structures because they have the best combination of strength and ductility. The elevated temperature tensile properties, Table III, show the excellent strength and ductility of these steels at temperatures as high as 1100°F. Yield and tensile values decrease slowly from room temperature to 800°F, and then more rapidly from 800° to 1200°F. Ductility values increase regularly with increasing testing temperature. The density of these chromium steels is 0.280 lb per cu in. The comparison with other materials on the basis of strength-density ratios for various temperatures is shown in Fig. 2.

In the temperature range of 300° to 1100°F, the strength-density ratios of either Halcomb 218 or Chro-Mow are superior to any of the

FIG. 2—Comparison of structural metals on strength-density ratio at elevated temperatures.



Part I of this two-part series, discussing application of stainless steels in high temperature aircraft service, appeared in last week's issue of The Iron Age.

TABLE I Chemical Compositions

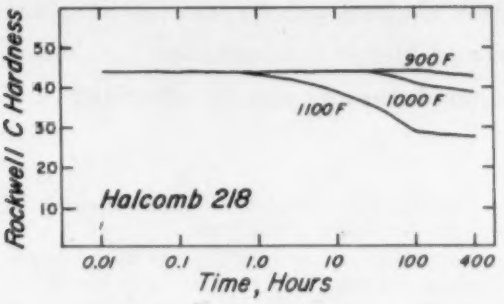
Grade	C	Mn	Si	Ni	Cr	V	W	Mo
Halcomb 218	0.38	0.34	1.10	0.15	5.21	0.40	—	1.38
Chro-Mow	0.32	0.44	0.95	0.12	5.00	0.18	1.31	1.36

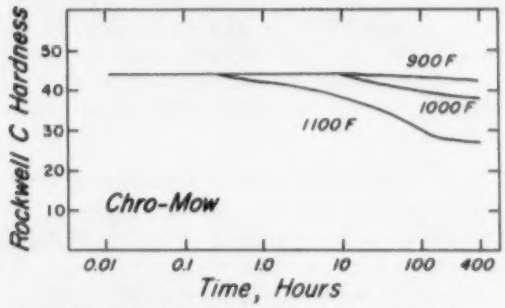
TABLE II

Coefficients of Thermal Expansion

In. per In. per Deg. F X 10^{-6}

Range, Deg F	Halcomb 218	Chro-Mow
80 – 200	5.8	6.1
80 – 400	6.3	6.5
80 – 800	6.9	7.0
80 – 1200	7.3	7.4
80 – 1450	7.5	7.5
500 – 1200	7.8	7.8





Top: FIG. 3A—Resistance to softening of Halcomb 218 during reheating for different times.

Bottom: FIG. 3B—Resistance to softening of Chro-Mow during reheating for different times.

other structural materials shown. The difference between them and the next best alloy, titanium C-130 AM, becomes more appreciable between 500° and 1100°F. In this range, their strength-density ratios are much better than those obtained for the ferritic and austenitic stainless grades. However, at temperatures above 1100°F, the ratios for the new austenitic HNM assume the leading position. The pre-eminent place of Halcomb 218 and Chro-Mow in the wide, intermediate temperature range has justified their selection for airframe construction.

Tested over long periods

The question of whether or not steel, when heated continuously for long periods, shows the same deterioration in tensile strength as shown by aluminum alloys heated for long duration is asked frequently. Available evidence indicates there is no such loss with time, at least at temperatures up to about 750°F, and this is as expected, as the deterioration in heat treated aluminum alloys is due to overaging which usually does not arise in steel.

In a number of tests on low alloy structural steels at temperatures up to 660°F, it has been found[2] there was no indication of additional deterioration in either tensile or Izod values due to prolonged heating up to 1000 hours. Indeed, some improvement as a result of long

TABLE III — Elevated Temperature Tensile Tests

Grade	Test Temp., Deg F	0.2 pct Yield, psi	Tensile, psi	Elongation, pct	Reduction in Area, pct
Halcomb 218	80	184000	217000	13	40
	800	137000	171000	17	56
	900	125000	155000	20	65
	1000	105000	145000	19	65
	1100	88000	110000	21	69
Chro-Mow	80	185000	205000	12	42
	800	15`000	182000	18	49
	900	147000	167000	19	55
	1000	120000	137000	25	64
	1100	103000	121000	18	72

Test pieces hardened and tempered to about Rc 44.

TABLE IV — Toughness at Elevated Temperatures

Grade	Temperature–Time	Hardness, Rc	Charpy V-notch Impact, ft-lb 80F	210F	300F	500F	800F	1000F
Halcomb 218	1100 °F – 5 hr	45	24	30	31	41	38	39
Chro-Mow	1100 °F – 4 hr	44	18	26	30	37	40	44

Both steels oil quenched from 1800 °F.

"Halcomb 218 and Chro-Mow showed good room temperature toughness and much improved toughness at higher temperatures . . . Good notch ductility at elevated temperatures can also be obtained . . ."

soaking at the elevated temperatures was indicated. However, low alloy structural steels heated at 750° to 930°F for very long periods (1½ to 2 years) can show some deterioration.[3]

Hot work steels are usually put in service at a hardness between Rc 35 and 50. Once such a steel has been tempered and put into service, it is of interest to know if it will change in hardness because of exposure to high temperatures for extended periods of time. Data of this kind, Figs. 3A and 3B, are valuable in evaluating Halcomb 218 and Chro-Mow for aircraft components. In all cases the specimens were first hardened and tempered to Rc 44. They were then reheated for different times at temperatures from 900° to 1250°F and tested for resistance to softening.

Master tempering curves prove useful

These steels are about of equal resistance to softening, the structural stability of the steel exposed for very long periods of time in the 900° to 1000°F range being noteworthy. Only after long heating periods do the steels continue to soften with time when tested at temperatures as high as 100°F below the original tempering temperature. The master tempering curves, are useful in evaluating the effect of elevated service temperature. For example, if the maximum service temperature is expected to be about 1000°F with 200 hours exposure at this temperature during the life of the aircraft, the hardness of Halcomb 218 heat treated to about Rc 45 would decrease to about Rc 40. Such curves provide a basis for estimating the effect of other combinations of service temperature and time.

Notch ductility and heat treatability are important criteria for the selection of steels for aircraft structures. To study the toughness of Halcomb 218 and Chro-Mow, V-Notch Charpy tests were made on samples quenched and tempered to about Rc 44. The results are shown in Table IV. At room temperature both steels have adequate toughness, and at elevated temperature there is an appreciable improvement in toughness.

Simulated cooling procedures used

The effect of hardness on the toughness of these steels was determined by simulated cooling procedures and tempering to a range of hardness between Rc 34 and 50. The data for testing temperatures up to 800°F are presented in Table V. They show that good notch ductility values can be expected at elevated temperatures when these steels are tempered to hardnesses which will produce adequate elevated temperature tensile properties.

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TABLE V **Effect of Hardness on V-Notch Charpy Impact**

Grade	Temperature–Time	Hardness, Rc	Ft-Lb When Tested at 80 °F	300 °F	500 °F	800 °F
Halcomb 218	1170 °F – 4 hr	34	17–19	44–53	54–58	58–61
	1130 °F – 4 hr	37	11–14	39–42	47–49	51–56
	1100 °F – 3 hr	44	14–15	23–27	31–34	28–31
	1075 °F – 4 hr	48	8–10	14–14	21–24	20–21
Chro-Mow	1165 °F – 4 hr	36	14–16	20–23	47–53	58–62
	1120 °F – 4 hr	39	11–16	21–23	44–49	62–62
	1100 °F – 3 hr	44	14–16	24–25	29–31	32–35
	1060 °F – 4 hr	50	5–5	12–12	12–12	17–19

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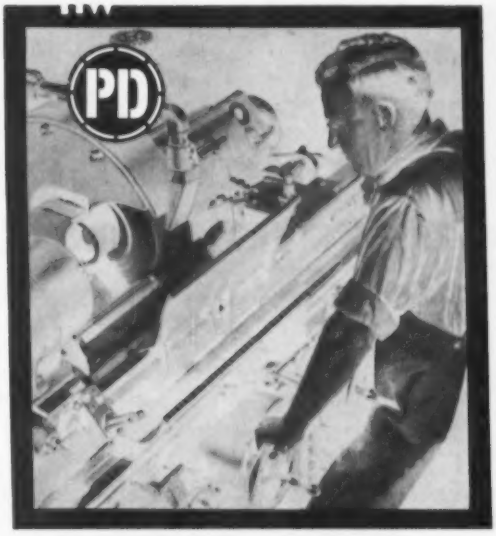

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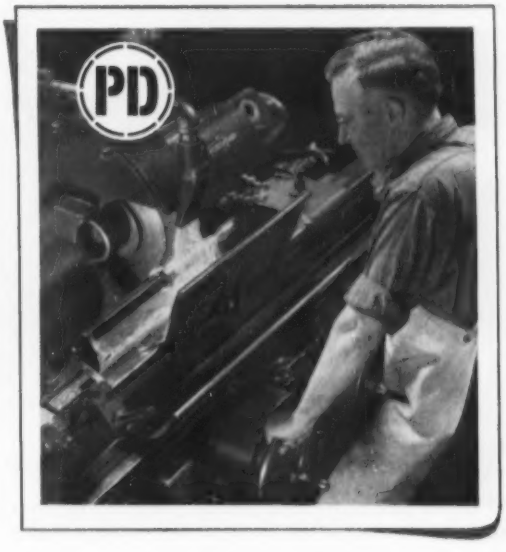

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These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108

Hydraulics

The "shear-seal" principle, a new development in the hydraulics field, is described in this booklet. It is such a complete departure from conventional valving principles that even after Barksdale Valves' five years of pioneering in industrial hydraulics, it is still news to most valve users. Technical information is included that is not yet even in textbooks. *Barksdale Valves.*

For free copy circle No. 15 on postcard, p. 113.

Extrusion presses

Production capabilities of new 12,000 ton and 8,000 ton hydraulic extrusion presses are described. The bulletin, prepared for the design engineer, contains information on the heavy extrusion presses and auxiliary equipment now being installed by Harvey. Material covered includes minimum thicknesses for various alloys and circle sizes. *Harvey Aluminum Sales, Inc.*

For free copy circle No. 16 on postcard, p. 113.

Electronic machine tool

The Elox M-500 electronic machine tool for precision drilling, die sinking, broaching and reaming is described in this illustrated booklet. With the industrial trend to harder, higher alloyed metals, the M-500 answers the problem of machinability, regardless of metal hardness or density. A training program given at the Elox plant has been initiated for personnel you wish to acquaint with the precision electronic machining process. *Elox Corp. of Michigan.*

For free copy circle No. 17 on postcard, p. 113.

Powder metallurgy

A 4-page folder lists metal specifications for sleeve bearings, bushings and intricate shapes manufactured by powder metallurgy, as well as typical sizes and tolerances. The description of various grades of porous bronze, porous iron-copper, porous iron and infiltrated iron is given, plus other technical data. *Detroit Sintered Metals Corp.*

For free copy circle No. 18 on postcard, p. 113.

Automatic nut formers

An 8-page 2-color bulletin covers a newly designed line of automatic nut formers, which are multiple-die, single-stroke transfer headers especially equipped to produce automatically a cold, forged, finished nut blank with every stroke of the heading ram or gate. Rates range from 60 to 125 blanks per minute. Production samples and a typical operation sequence are shown. *The Waterbury Farrel Foundry and Machine Co.*

For free copy circle No. 19 on postcard, p. 113.

Molybdenum

A flow chart showing how molybdenum is manufactured and controlled quality-wise from oxide to finished product is featured in a new 20-page brochure. The booklet provides information on molybdenum properties, processing, and product use, and includes a tabulation of Sylvania molybdenum products and their characteristics. Also included are conversion factors to use in calculations and a full-page resistance-temperature nomograph chart. *Sylvania Electric Products, Inc.*

For free copy circle No. 20 on postcard, p. 113.

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Shell machine

This folder describes the completely automatic "Blo-core" shell machine. It is designed for use in foundries, large or small, making shell molds and shell cores on a production basis. This flexible machine makes shell molds and shell cores every 20 seconds. *C & S Products Co.*

For free copy circle No. 21 on postcard, p. 113.

Filters

A bulletin describes the operation of a new self-cleaning pressure filter designed to remove sludge formed by dissolving electrodes, prevent dust, dirt and oil contamination of metal parts during plating operations. *Hygrade Metal Finishing Div., U. S. Hoffman Machinery Corp.*

For free copy circle No. 22 on postcard, p. 113.

Roller skids

A 12-page booklet giving instructions for best use of Multiton roller skids has been prepared. They are self-laying track dollies, designed especially for the movement of machinery and extra heavy loads. *Stokvis Edera & Co., Inc.*

For free copy circle No. 23 on postcard, p. 113.

Carbide inserts

Advantages and mechanical features of the new Multicut series of holders for "throwaway" carbide inserts are described and illustrated. Sketches and photographs are used to show holders, principal components and typical operations in which each of the six basic styles of holders are used. All holders are available from stock for either right or left hand use. *Wesson Co.*

For free copy circle No. 24 on postcard, p. 113.

Microscopes

Forty-four typical applications of the Norelco 20 and 75 Angstrom electron microscopes are listed, together with design and operating information on the large EM-100 instrument and on the smaller EM-75 unit. *Research & Control Instruments Div., North American Philips Co., Inc.*

For free copy circle No. 25 on postcard, p. 113.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Speed reducers

The manufacturers of a complete line of speed reducers and standard commercial gearing announce that a new speed reducer catalog is available. It contains many features that make it useful to engineers and users of geared drives. The complete range of sizes, including several new larger sizes, is shown. *The Horsburgh & Scott Co.*

For free copy circle No. 26 on postcard, p. 113.

Magnetic ideas

A 24-page booklet features descriptions of how "magnetic ideas" have been applied with engineering know-how to solve vexing problems in innumerable industries. Case histories explain how various companies are using permanent, non-electric magnets to prevent iron contamination in their products, protect their machinery from damage by tramp iron, or prevent fires. A new Magnalarm which signals automatically when the magnet needs cleaning is described. *Eriez Manufacturing Co.*

For free copy circle No. 27 on postcard, p. 113.

Metal cutting lathes

The new Delta 11-in. metal-cutting lathe and a complete line of engineered accessories is described in an 8-page folder. Design features of the tool are explained with the aid of photos and drawings. Ten basic models are described. Designed to fill the need for a low-cost quality lathe for machine shops and tool rooms, the tool underwent five years of research before its introduction. *Delta Power Tool Div., Rockwell Manufacturing Co.*

For free copy circle No. 28 on postcard, p. 113.

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INDUSTRY GEARS FOR HIGHER PRODUCTIVE STANDARDS

C.P.C. and THE BUDD COMPANY take a new look at frame production

The specially designed 1,000 ton press shown here illustrates a new approach to the production of automotive frame sections—edgewise forming of blanks into the irregularly-shaped frames. *Clearing Productivity Consultants worked with The Budd Company to develop this unique press for their specific requirements. An unusual slide action and automatic feed were developed which simplify the forming operation, speed material handling and conserve material.

Throughout industry, far-sighted manufacturers are meeting the pressure of rising costs with improved metalforming methods suggested by *C.P.C. This service is comprised of a staff of engineers who have worked directly with firms in every field of press metalworking. The experience of these men can be combined with yours to help work out solutions for higher production standards in your plant. Feel perfectly free to investigate this service. Call or write us at no obligation.

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION DIVISION OF U. S. INDUSTRIES, INC. USI CMC

6499 WEST 65th STREET, CHICAGO 38, ILLINOIS • HAMILTON PLANT, HAMILTON, OHIO

Sanitation's A Cinch with *Carpenter* Stainless Tubing for Parts or Process Lines

For example: The filler tubes for ½ gallon milk bottles must be of such a quality that the manufacturer can polish both I.D. and O.D. to the equivalent of a sanitary finish. That's why he specifies Carpenter Stainless Tubing.

Carpenter Stainless Is First Choice For:

Finish There are never any pits, checks or scratches when you buy polished Carpenter Stainless Tubing.

Strength Tight adherence to specifications for physicals is a Carpenter specialty.

Light Weight Because the analysis is exact—the wall within specifications—the dimensions, too. Carpenter weights are on-the-button.

Ductility Carpenter Stainless is easy to fabricate because tempers are "as specified".

Uniformity Carpenter customers depend on the uniformity of Carpenter quality—length-to-length, order-to-order.

Availability There is a Carpenter Distributor with adequate warehouse stocks as close as your telephone. He is ready, willing and able to give you any engineering or design help you need. When you call Carpenter, "One Call Does It All".

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y., "CARSTEELCO"

New Technical Bulletin on Fabrication Data for Carpenter Stainless Tubing and Pipe now available. Send for free copy.

Carpenter

Stainless Tubing & Pipe

Get Extra Sub-hearth

SAFETY AND LONGER LIFE

with Permanente Periclase D-S Brick

THIS superior brick has been *especially designed* to withstand sub-hearth conditions. Thus, it gives maximum protection against costly breakthroughs and provides longer sub-hearth life.

All the important properties outlined by major steel company ceramists as most desirable for sub-hearth brick are found in Permanente Periclase D-S Brick.

High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia. Absence of chrome eliminates the reduction of chromium oxide and damage to the refractory structure. (Brick contains only 0.8% Cr_2O_3.)

Low iron content minimizes refractory damage from alternate oxidation and reduction of iron oxide and other iron compounds. Absence of calcium oxide prevents damage caused by slaking during slow heat-ups or while furnace is idle. (Brick contains only 0.6% Fe_2O_3 and 1.2% CaO.)

With all its many advantages, Permanente Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Permanente PERICLASE Brick for the Steel Industry:

- Permanente Periclase Brick (D-S)
- Permanente Periclase Chrome Brick (PCA)
- Permanente Chrome Periclase Brick (CPA)

Now available! A companion mortar for Permanente D-S brick. High purity periclase composition *and* maximum workability.

Installation advice on request

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick • Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

SIMONDS

INDUSTRIAL CUT GEARS

LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom

GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

QUALITY GEARS FOR OVER 60 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS
WORM GEARS
RACKS
PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SIMONDS GEARS

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA.

MACHINING: Making Splines

Production of splines on both ends of a thin-walled hollow tube simplified with unusual machine . . . All teeth made simultaneously . . . Machine tailored to job.

Producing splines on both ends of a relatively thin-walled hollow shaft, 14 in. long, was a tough problem for a major builder of automotive transmissions. Hobbing was out of the question because of the adjacent bearing surface shoulders.

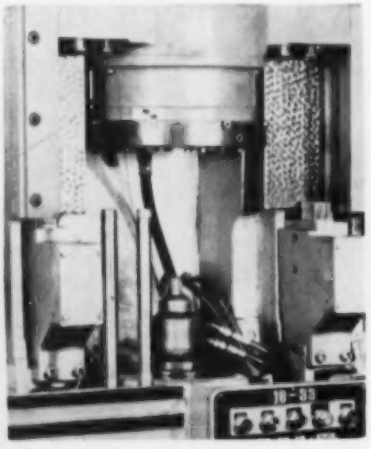
The 28-tooth, 24-pitch splines have a face width of ⅞ in. at one end and 1¼ in. at the other. Shaping or roll forming the splines was indicated due to the adjacent bearing surfaces which were slightly larger in diameter than the outside diameter of the splines.

Since the walls of the shaft were too thin to withstand the pressures of the Roto-Flo spline rolling process, shaping remained as the most practical method of producing the splines. The Shear-Speed gear shaper method of producing all of the spline teeth simultaneously, gave the desired high production rate.

Tailor Machine to Job

The Shear-Speed machine, with a 3-in. diam work capacity, was the right machine for the splines, but its throat clearance could only take work up to 10 in. long. Since a transmission shaft was 14 in. long, an additional 4 inches of throat clearance were needed.

Michigan Tool Co., Detroit, makers of the machine, increased the height of the main column casting, mounted a longer-stroke hydraulic piston, and made other modifications to tailor the machine to the job. Other fixtures were added for speed and safety. Changeover from shaping splines on one end of the shaft to the other takes about 15 minutes.



Cut splines in 15 sec . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Assembly:

Light-load conveyor speeds TV chassis assembly.

To simplify and speed the movements of dollies used in assembling television chassis, Emerson Radio & Phonograph Co., Jersey City, installed two overhead, light-load conveyor systems that travel in one direction at 12 fpm. The installation was made by The Monoflo Div., M-H Standard Co., Jersey City.

In operation, the system returns the dollies to the start of the production line after a television chassis has been removed. Each conveyor system has two conveyors. The first conveyor makes a short run at working height, takes a 90° turn, rises about 4 feet, then continues horizontally for a short distance.

At the end of the conveyor,

dollies are transferred automatically to the second conveyor. Final discharge of the dolly is onto a storage rail where it remains soldier fashion till needed.

The system is a flexible ¾ in. carbon steel screw which turns in a metal retaining rail. The load-carrying hook automatically engages the top of the screw-thread which propels the hook along the rail at a steady, or varied rate when desired.

Handling:

Electronics control 3-mile belt conveyor.

One man controls nearly three miles of rubber conveyor belts which operate in a four-direction network to keep 1400 tons of coal an hour moving into a giant electric power producing steam plant near Paducah, Ky.

Manufactured and installed by The B. F. Goodrich Co. Industrial Products Div., Akron, elevated sections of the belt run as high as 50 ft above ground. The belts go up steep grades, span a river channel and road, and travel underground for short runs to reach a 1,450,000-ton stockpiling area.

System Is Flexible

The belt system, controlled through a one-man electronic panel, can be directed to carry coal to the plant for immediate use or to a stockpile for storage.

The entire system is composed of 10 flights, or sections, of rubber conveyor belting, ranging in length from 200 to 2640 ft, pulley to pulley distance. Belts are as wide as 54 in. and move at speeds up to 480 fpm. Three belts carry their loads up 16° inclines. Transfer points located where one belt flight ends and another begins automatically cause coal to discharge from one belt to another.

On the conveyor run from river to plant, a 260-ft belt section picks up coal from barges. A clamshell-type crane deposits coal on the belt through a hopper. Coal is carried up hill to a transfer point 75 ft above the initial loading point.

Here the coal loads automatically onto a half-mile long belt for a

LIFE can depend on the precision of a "thread"

Whether you are traveling through space at super-sonic speeds . . . enjoying a Sunday drive with the family . . . or harvesting the crops . . . life can depend on the precision of a thread.

Chandler, as a leading manufacturer of fasteners, specializes in precision products only. Chandler fasteners are manufactured to the highest standards of uniformity.

The spider isn't the only creature whose life depends on a thread. Because of the tremendous demands made on today's machines, Chandler pays particular attention to the threads of every fastener. In fact, Chandler specializes in thread rolling after heat treating.

CHANDLER PRODUCTS CORPORATION

1434 Chardon Road • Cleveland 17, Ohio

6173-CH

This alloy list keeps getting longer and longer!

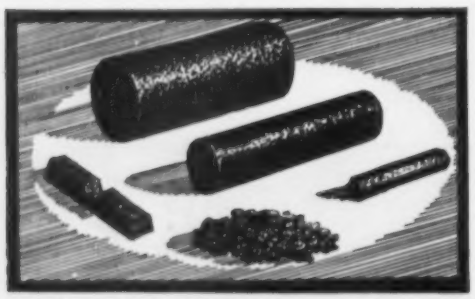
Cannon-Muskegon can supply scores of special and standard alloys for remelt or reprocessing, certified to your exact specifications

*NI RESIST
SAE 1020
SAE 4130
SAE 52100
SAE 6150
SAE 8630
AMS 5382B
AMS 5385B
AMS 5388
PWA 651
ARMCO 17-4-PH
4750
AISI 300 SERIES
AISI 400 SERIES
*MONEL
*INCONEL
ACI-H7
18-4-1
IIB2
IID2
INVAR
CO-CR-W ALLOYS
CU-NI ALLOYS
NI-CR ALLOYS
NI-FE ALLOYS
NI-CR-FE ALLOYS
CR-FE ALLOYS

*©International Nickel Co.

A *long* alloy list is an excellent indication of long alloy experience! As source for many of the nation's major investment casting suppliers and others, Cannon-Muskegon furnishes a great variety of alloys for remelt or reprocessing. Alloys include super stainless and tool steels, as well as nickel and cobalt-base alloys. Other alloys are prepared specially for medical, aeronautical, electronic, industrial and experimental uses.

These alloys are in addition to a wide range of carbon and 300 and 400 series stainless steels regularly carried in stock for *immediate* delivery. Remember . . . no matter what type alloy you specify each is backed with a notarized metal analysis insuring *exactly predictable* physical, chemical and electrical properties.



MASTERMET ALLOYS are available in either ingot, shot, hexagon bar, billet or 12"-long, 6" diameter cast round bar form. Alloys are shipped in drums with specifications clearly imprinted for fast selection and storage.

WRITE for your copy of New MasterMet Bulletin and technical data on the complete MasterMet alloy service.

Cannon-Muskegon
CORPORATION
2889 Lincoln Street • Muskegon, Michigan
METALLURGICAL SPECIALISTS

MASTERMET

Belts handle high volume of coal per hour . . . System links crusher and bunkers . . .

straight inland trip to the plant grounds. On this journey the conveyor system is supported by towers 50 ft above ground. Metal housings protect all belts and other conveyor equipment from the elements. The cargo spans a 100-ft wide channel and bridges a road before it unloads into a crusher.

Climbs Steep Grade

The crusher building is a four-story high steel structure in which the coal is sized to pieces not larger than 1¼ in. The crusher tower also houses the electronic controls for the entire belt system.

Coal destined for immediate use is carried by twin conveyor belts from the crusher up a 16° incline to storage bunkers. The twin belts, loaded beneath the crusher, lift their loads 115 ft high in a distance of 425 ft. These belts are 42 in. wide and each handles 700 tons of coal an hour.

Twin Elevating Belts

The twin elevating belts unload onto twin horizontal belts which run 855 ft across the full length of the building and above the storage bunkers. A movable "tripper" device enables the belts to unload their cargo into any one of 10 bunkers which feed fuel to the boilers.

Coal destined for storage leaves the crusher via a 42-in. wide 336-ft long belt which conveys it to a stockpiling area. To reclaim stockpiled coal for plant use requires two other conveyor belts. They operate in tunnels, and return the coal to the loading point beneath the crusher. These belts are 200 ft long, 42 in. wide and handle 700 tons an hour.

Handles 900 Tons Per Hour

Coal shipped by railroad is picked up by another leg of the belt system at the rotary car dumper. These loads move to the crusher on a 54-in. wide, 712-ft long belt which handles 900 tons an hour.

Everything is NEW on this BANTAM

Ready-Power Gas-Electric Power Unit

FOR MOTORIZED WALKIE TRUCKS

FOR RIDER TRUCKS UP TO 2000 LBS.

Interchangeable cover is flat for walkie trucks; recessed for rider trucks
Housing cover lifts off for complete access to engine
Recessed panel contains choke, key switch and starter button
End plates remove easily for access to generator
Five gallon fuel tank forms sub-base for unit

new PERFORMANCE

Quick, positive starts are assured with new 12-volt automotive-type starting and ignition system. *Complete choice of idling speeds* is yours because truck contactors are battery energized. New positive type governor.

new ACCESSIBILITY

Just lift the top cover and all engine accessories, controls and instruments are within easy reach. Louvered end plate can be removed in minutes for complete access to generator.

new VERSATILITY

The Ready-Power bantam model "W" is designed with *no projections*. It fits practically all makes and models of walking and small riding-type electric trucks. Interchange from truck to truck presents no problem.

Here's the most foolproof, most compact, most dependable power generating unit ever built for small truck use! Months of job testing have proved that it is ideally suited for all the jobs that small trucks must do. Ready-Power gives your trucks full electric power all the time with no fatigue, no letdown. Put it to work for you soon!

TRIAL OFFERED
IN YOUR PLANT—ON YOUR TRUCK

See the new Bantam Model W in action, right in your plant. A Ready-Power sales engineer will arrange all the details. Fill in and mail this coupon.

the All New

READY-POWER

BANTAM MODEL W

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

THE READY-POWER COMPANY
Detroit 8, Michigan

Gentlemen:
I am interested in your new Bantam Model W.
☐ Please send complete information.
☐ Please arrange a trial in my plant.

Company_____
Address_____
City_____ State_____
Signed_____ Title_____

PREMIUM CRANE SERVICE AT ECONOMICAL PRICES

Series "D" 'Load Lifter' Cranes are standardized, mass-produced cranes for average industrial service. They are priced far below other cranes for similar use, yet built into them are performance-proved features like those in "Shaw-Box" Heavy-Duty Cranes.

Three-girder bridge construction eliminates whipping and skewing. Bridge and trolley wheels are fixed on axles that rotate on antifriction bearings. Spotting is easy and accurate with fast-acting brakes and variable speed control, operated by push buttons on floor-controlled cranes and by master switches on cage-controlled cranes. You get the smooth efficiency of ball or roller bearings, plus gearing that operates in oil in sealed housings.

Put the dependable, economical service of a low-priced Series "D" All-Electric 'Load Lifter' Crane into your operations. You'll like the easy maintenance and the many protective features that safeguard man, load and crane. Capacities: 1 to 20 tons. Three basic types and three trolley styles available. Selection is easy. Write for Catalog 221 and make your choice.

'Load Lifter' CRANES

MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan
Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

Plastics:

New compound expands uses for nylon.

A new type nylon molding compound opens a wide range of new uses for nylon in industrial and consumer products. Nylon film of extremely high strength and clarity, and molded bottles are two examples of potential uses.

The new material, now in large-scale production by Barrett Div., Allied Chemical & Dye Corp., is known chemically as caprolactum-type nylon, and is also called nylon 6. Its commercial name is Plaskon Nylon 8200.

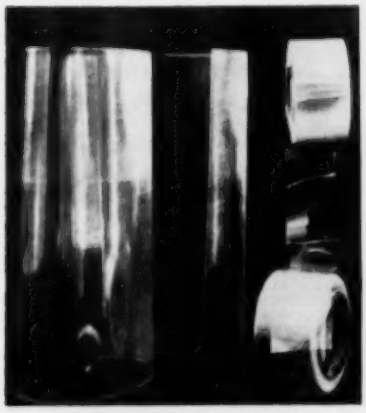
The material offers interesting new possibilities to molders and extruders. Its characteristics include high tensile strength, excellent abrasion resistance, light weight, self-lubricating properties, good resistance to chemicals, high heat resistance, and excellent impact strength and toughness. It is now possible to produce larger parts with thicker sections because of improved moldability.

Will Have Many Uses

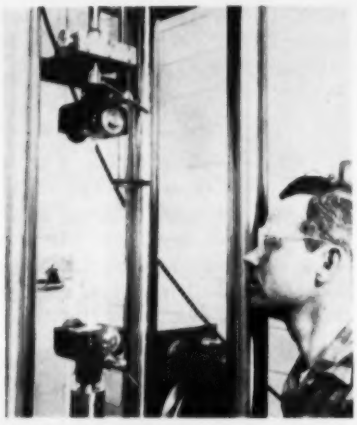
Typical applications include gears, bearings, bushings, wire jacketing, and cable coating, valves, instrument housings, and coil forms. It is also expected that the new compound will have wide use in the aircraft, automotive, electrical, hardware and appliance fields. Its specialized properties will also expand the use of nylon in the consumer field.

Because Plaskon Nylon 8200 can be extruded easily and has controllable crystalline structure, it can be formed into a clear film with high strength, toughness, abrasion resistance and heat resistance. In its unoriented state, this film will probably be used as a laminating material, in tapes, and as sheeting for conveyors.

Special production treatment can improve the physical properties of the film. Such film can be made thinner and will have many applications in the packaging field. Its suitability for bottles opens up markets for the packaging of chemicals previously not possible with plastic containers.

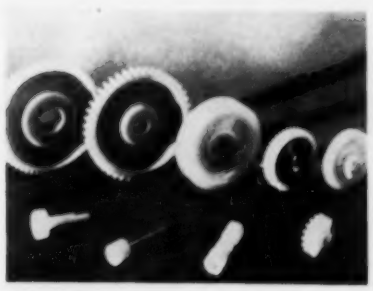


Tough films have clarity . . .

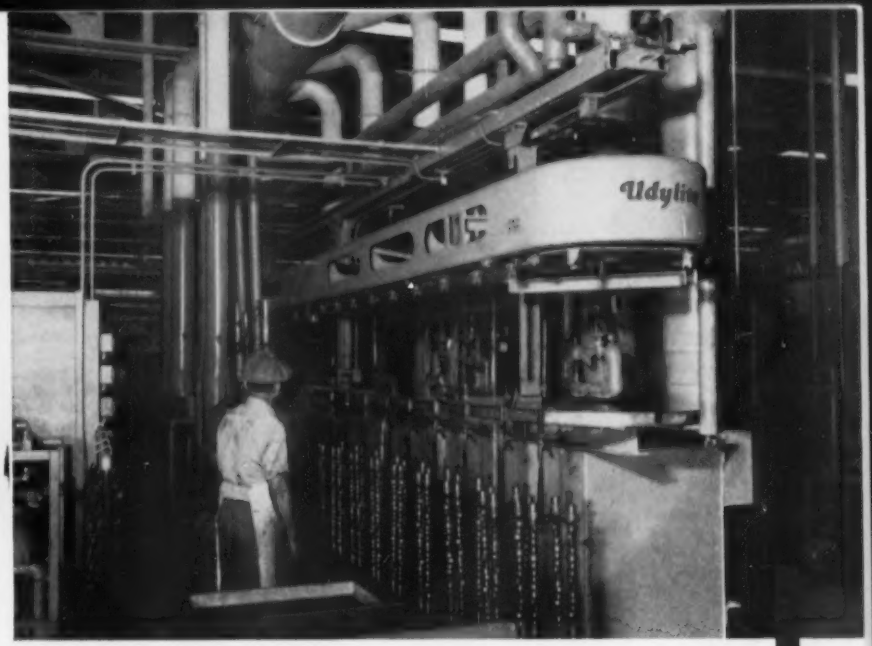


About 300 pct elongation . . .

Ideal for molding . . .



Molds accurately . . .



ASK THE COMPANY WHO OWNS THEM

New Packard Plant Uses Three Udylite Plating Machines in Modern, Efficient Manufacturing Lines

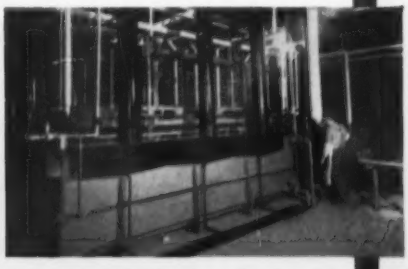
At the Packard Motor Car Company's new, modern Utica, Michigan plant, three Udylite Junior Full Automatic metal finishing machines are processing parts on three feeder lines that deliver components to the final assembly line. The machines are placed right in the flow of work without the necessity of a special plating room.

These Udylite machines are used for Lubrite of camshafts (above); tin plating pistons (lower left); and anodizing of miscellaneus parts (lower right).

The Udylite Junior Full Automatic is ideal for any production line. There is no need of moving parts from a line to a remote plating department and then back to the line.

The Udylite Junior will give you high production capacity with a minimum of floor space. It's portable—easily moved when you change your plant layout. But best of all, its cost is low.

A Udylite Junior Full Automatic may be the answer to your factory automation problem. Let us tell you more about it.



WORLD'S LARGEST PLATING SUPPLIER

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

NOW! THESE NEW BULLETINS

TELL ALL ABOUT

BRIDGEPORT GRINDING AND ABRASIVE CUT-OFF MACHINES

With their recent acquisition of the Bridgeport Line, LOBDELL UNITED DIVISION, United Engineering and Foundry Company, announces the publication of these two new bulletins. One covers the Bridgeport Line of Grinding Machinery and the other explains the Bridgeport Line of "ABRASAW" Abrasive Cut-Off Machines.

In the Grinding Machinery bulletin, illustrations, specifications and features are well brought out on the complete range of sizes of Face and Knife Grinders, Vertical Spindle Surface Grinders, Traveling Head Knife Grinders and Floor Grinders.

Similar information is equally as well illuminated in the "ABRASAW" Cut-Off Machine Bulletin—also, some interesting performance data and photographic examples.

Write for copies of these bulletins to:

LOBDELL UNITED DIVISION

1836 WILMINGTON 99, DELAWARE 1955

UNITED ENGINEERING AND FOUNDRY COMPANY

Abrasives:

Dust collector recovers expensive materials.

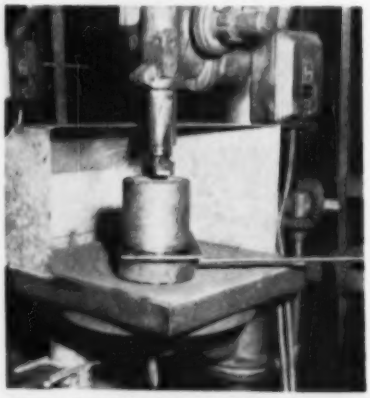
At $12.50 a pound, abrasive is an expensive material to blow out of a building through an exhaust system. It's a high price to pay for clean air.

But the air in any manufacturing plant must be clean otherwise the damage that can be caused by abrasive particles getting into machinery can be extensive.

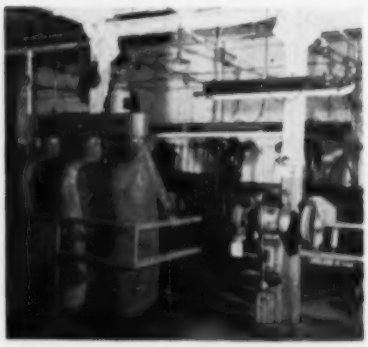
At the Parts Mfg. Co., Greenfield, Mass., the problem was extensive. At one time, the bill for 600-grit abrasive ran to $1000 a month. That represented a lot of dust inherent in the dry lapping operations.

Plan Backfires

When the firm decided to move six machines from the rear of the plant into the main plant to facilitate materials handling and cut down the large heating load, the plan backfired. It hadn't counted on the deluge of dust.



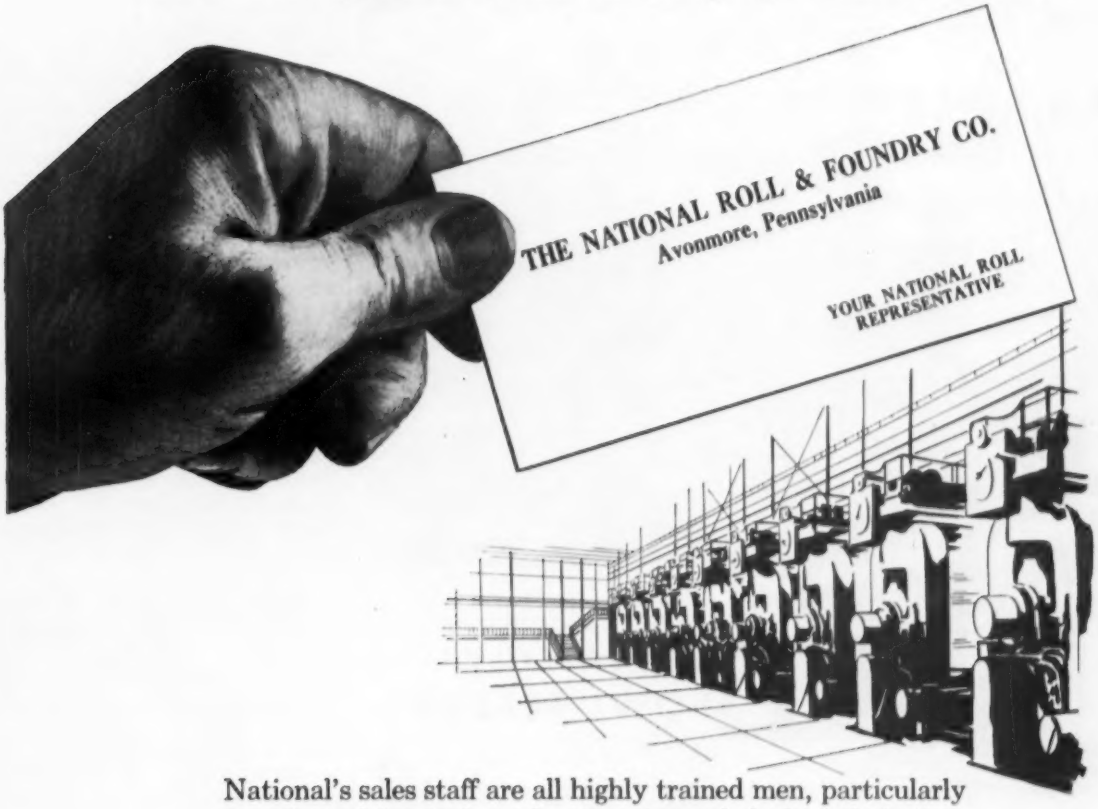
Hood collects dust . . .



Abrasives recovered . . .

Roll Problems?

Here's a good man to help you lick them



National's sales staff are all highly trained men, particularly experienced in steel production. A good deal of their time is spent in customers' plants analyzing production problems and advising the type of rolls and castings that will do each particular job most satisfactorily.

They are well aware of the many metallurgical and rolling problems that occur and are ready to help you find the solution.

. . . So the next time you run into a production problem, be sure to call on your National Roll representative—he is ready to serve you.

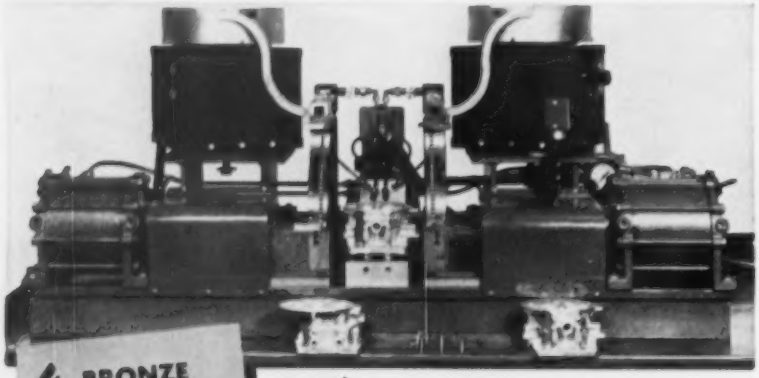
THE NATIONAL ROLL & FOUNDRY CO.

Avonmore, Pennsylvania

Specialists in Iron, Alloy Iron and Steel Rolls and Castings, Steel Armor Castings

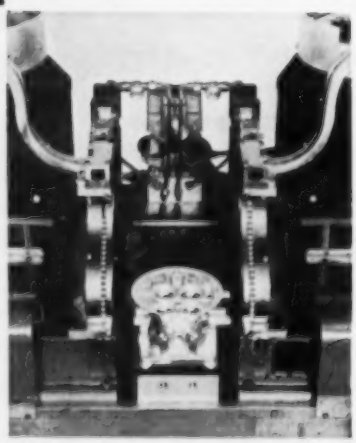
4 to 1 PRODUCTION

4 to 1 Time Saving!...
4 to 1 Cost Reduction!...4 to 1 Labor Saving!
OVER PREVIOUS *Hand* PRODUCTION!



4 BRONZE BUSHINGS INSERTED INTO 4 BARREL CARBURETOR CASTINGS—

Using DPS VIBRATORY BOWL FEEDERS



● The bushings are fed from two DPS Bowl Feeders and transferred into four opposed tracks, bringing the bushings into alignment . . . Operator simply places the castings over locating pins in the fixture and cycles the machine by means of a foot switch. Air actuated rams come forward, pick up two bushings on each side and press them to the proper depth with one stroke, previously an individual hand operation. Machine cycle, two seconds.

How about YOUR Assembling Method?

● DPS has solved this and thousands of other bottlenecks through the use of their POWER SCREWDRIVERS, PARTS FEEDERS and SPECIAL MACHINES. We can do the same for you. Tell us your problem.

DETROIT POWER SCREWDRIVER CO.
2811 W. FORT ST. DETROIT 16, MICH.

Dust collectors with low hood velocity installed to prevent abrasive from floating away . . .

After studying heating loads, abrasive damage and methods of recovering the abrasive, a system was devised which would solve the whole problem. Dust collectors with a low hood velocity were installed to prevent the abrasive from floating away from the machines. These particles were, in turn, collected in filters and recovered for further use.

The type of collector chosen is made by Torit Mfg. Co., St. Paul. It exhausts the air back into the room to maintain a heat balance.

Savings of about $200 per month resulted from the recovery of abrasives alone. In addition, worker efficiency has improved, working conditions are better and plant appearance is much neater.

Brazing

Diamond mounting method saves 90 pct in crystal cost.

In conventional mounting of diamonds in dressing tools, as much as 90 pct of the stone may be buried in the tool to gain rigidity and prevent loss of the stone. Now, a considerably smaller diamond can be mounted in a shallow cavity on the surface of a single-point wheel-dressing tool. Crystal savings run as high as 90 pct.

Brazed By Induction

The method was developed by Dr. H. T. Hall who worked on the team responsible for the creation of man-made diamonds at the General Electric Research Laboratory. One secret is the use of titanium hydride as a wetting agent, and a solder, such as silver-copper. Parts are brazed by induction or radiation heating in a high-vacuum system, or in an atmosphere of very pure argon or hydrogen gas.

In strength tests, a small diamond tip mounted on a microtone blade and revolved at 56,000 rpm, placed a force of about 50,000 psi

on the bonding area. This force was insufficient to dislodge the diamond.

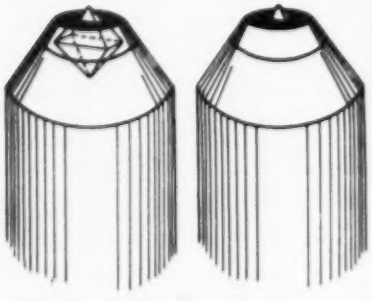
Advantages Are Four-fold

The process already shows great promise of industrial use. Its advantages are four-fold: The diamond is anchored more securely to its mount. The wasted root, which in many cases is three-fourths of the volume of the entire tool point, can be eliminated.

Smaller Diamonds Used

Another advantage is that much smaller diamonds can be mounted to provide the same working surface and since diamond prices rise steeply with increasing size, a substantial saving results. Heat transfer is also better when a diamond is bonded to metal than when there is only a mechanical connection. A cooler working diamond will wear longer and is less likely to fracture from temperature shock.

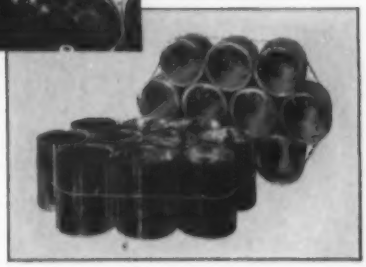
Ready for vacuum bond . . .



Conventional vs. flush . . .

USS Gerrard ties ANYTHING you've ever seen

CARLOADS OF OIL DRUMS TO BUNDLES OF TIN CANS



• USS GERRARD Strapping, Round or Flat, is available in a wide range of sizes—tailored for every tying application from small parcels to palletizing, unitizing, crating, and carloading.

• USS GERRARD Round Strapping costs about *40% less* than any other form of metal reinforcement.

• USS GERRARD hand-operated and semi-automatic machines tie quickly, efficiently.

• USS GERRARD-strapped bundles and pallets can be handled with greater safety in less time. Accidents averted, man-hours saved.

• Steel-strapped bundles require only one inventory. No loose pieces. Pilferage eliminated . . . damage prevented.

• Single-source buying of both Round and Flat Steel Strapping reduces freight charges and paper work.

Bring your packaging and tying problems to USS GERRARD. Our engineers are here to help you solve them —at no cost to you.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
General Offices: Chicago, Illinois

SEND FOR THIS NEW FREE BOOKLET NOW

Gerrard Steel Strapping
4711 South Richmond St., Chicago 32, Ill.
Please send me, free of charge, the new 36-page GERRARD Blue Book of Packaging.

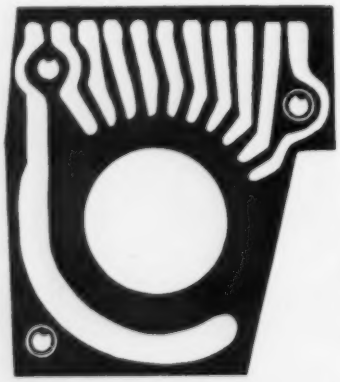
Name.....
Company.....
Address.....
City..... State.....

USS GERRARD STEEL STRAPPING
Round and Flat
UNITED STATES STEEL

What's going on in NON-FERROUS METALS

. . . solder made on automatic machines

is more precisely compounded and free of flaws. Used increasingly for printed circuits (as pictured at right) in the electronics field, for sheet metal work, and for general soldering everywhere in industry. Called CASTOMATIC® solder, it is made on patented machines, by Federated only. Write for 36-page "Solder" brochure.

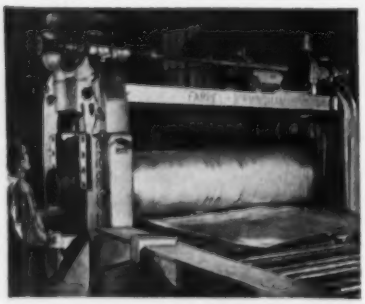


. . . zinc dust for the chemical industry

is an effective chemical reducing agent; yields salable by-products; costs less than other reducing agents. It is also used in paints which protect against corrosion.

. . . sheet lead for radiation protection

is used in the new Deep Therapy room of Seattle's Swedish Hospital. Federated supplied metallurgical help and all the lead. Through Federated, American industry has access to the acknowledged center of lead research and technical service. Ask for 48-page "Lead Handbook".



Federated people work constantly with copper, tin, lead, zinc and other non-ferrous metals. The company makes thousands of non-ferrous items. That is why it has earned the name **"Headquarters for Non-ferrous metals."**

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
IN CANADA: FEDERATED METALS CANADA, LTD., TORONTO AND MONTREAL
ALUMINUM, MAGNESIUM, BABBITTS, BRASS, BRONZE, ANODES, ZINC DUST, DIE CASTING METALS, LEAD AND LEAD PRODUCTS, SOLDERS, TYPE METALS

Diecasting:

Drilling, tapping eliminated in diecast part.

Multiple drilling and tapping operations have been eliminated, cost reduced and production increased through the use of zinc diecast jaws on a wire and cable stripper assembly made by General Cement Mfg. Co., Rockford, Ill.

Use of zinc alloy has the advantage of accepting the entry of self-tapping screws with ease. All screw holes in the two jaws, except two, are part of the zinc die-casting as produced by Chicago White Metal Products, Inc. Use of self-tapping screws eliminates eight drilling and tapping operations. Seven of the eight holes are blind.

No drilling, tapping . . .

Because of the intricate shape of the jaws, zinc diecasting is a quick and inexpensive method of producing them. Grooves, ribs, cutouts, recesses and bosses combine to develop a shape impossible to achieve at a reasonable cost by other methods. Diecasting produces the complex shape in a single operation.

Inspection:

New units check small parts automatically.

All materials handling, mechanical inspection and magnetic testing functions for speaker magnets, previously done in a 50-sq ft area, are centralized in 16 ft of automated straight-line space occupied by two new electronically-controlled machines. Installed in the Edmore, Mich., plant of General Electric's Carboloy Dept., the two miniature "production" lines have tripled the

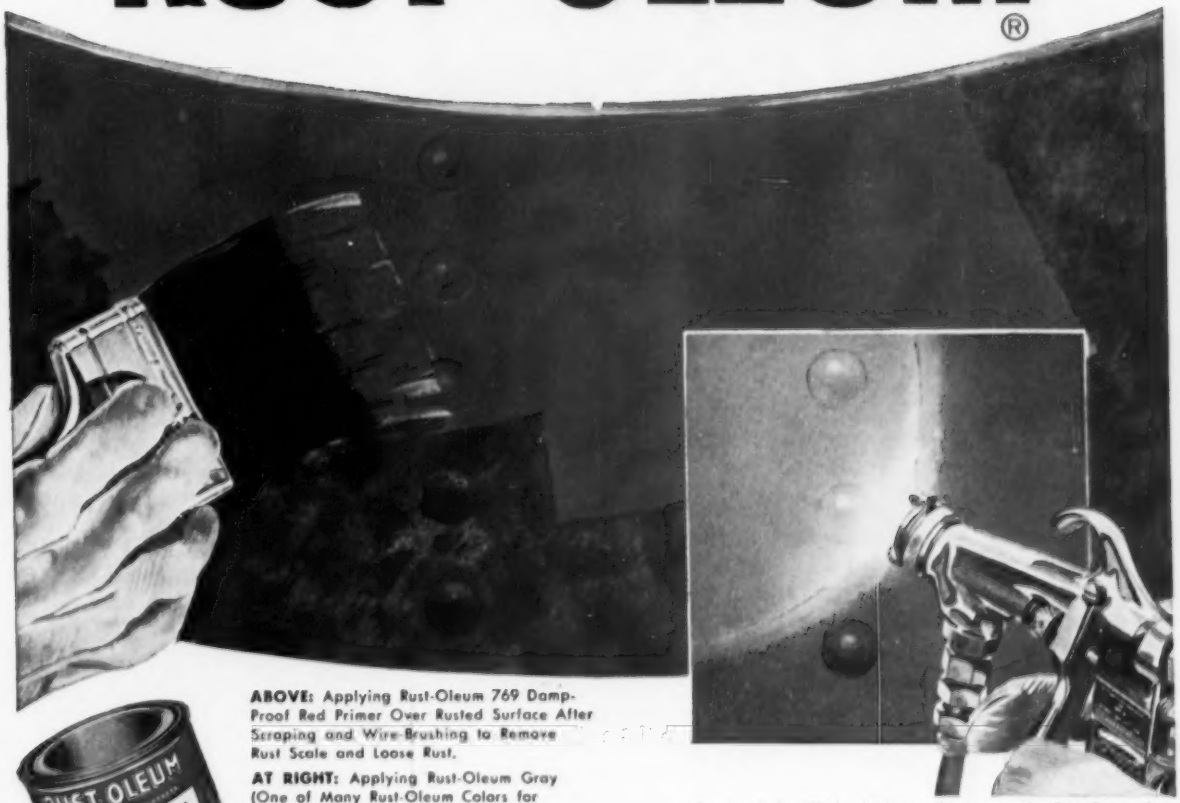
STOP RUST!

with

RUST-OLEUM®

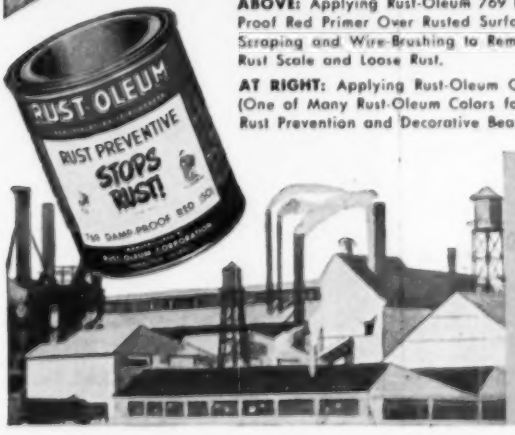
Beautify As You Protect

Simply brush Rust-Oleum 769 Damp-Proof Red Primer directly over the rusted surface after scraping and wire-brushing to remove rust scale and loose rust. Rust-Oleum's specially-processed fish oil vehicle penetrates rust to bare metal—saving time, money, and metal! Then—beautify as you protect with Rust-Oleum's brilliant array of finish coatings. Specify Rust-Oleum for new construction, maintenance, and re-modeling. See Sweet's for complete catalog and nearest Rust-Oleum Industrial Distributor, or clip coupon to your letterhead . . . and mail today.



ABOVE: Applying Rust-Oleum 769 Damp-Proof Red Primer Over Rusted Surface After Scraping and Wire-Brushing to Remove Rust Scale and Loose Rust.

AT RIGHT: Applying Rust-Oleum Gray (One of Many Rust-Oleum Colors for Rust Prevention and Decorative Beauty).



See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

There is only one Rust-Oleum. It is distinctive as your own fingerprint.

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO:
Rust-Oleum Corporation, 2563 Oakton St., Evanston, Ill.

- ☐ Please Show Me the Rust-Oleum "Rusted Panel Demonstration."
- ☐ Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.
- ☐ Complete Literature with Color Chart.
- ☐ Nearest Rust-Oleum Industrial Distributor.

Forming the above Special Phillips Truss Head in two blows presented a difficult upsetting task. This was successfully accomplished when the manufacturer specified Keystone "Special Processed" Cold Heading Wire.

The uniform grain flow properties of "Special Processed" Wire provided the desired upsetting and die forming qualities necessary to form the thin head section without distortion or cracking. The structural soundness and uniformity of "Special Processed" Wire further proved itself by trouble-free machine operation, longer die life and a finished product of the highest quality.

Next time you have a difficult cold heading job, try "Special Processed" Wire. See your Keystone representative or write for more information.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

plant's speaker magnet production.

With only two operators, electronic components in the new units actuate belt conveyors, drop chutes, hoppers, magazine feeders, aligning pushers, miniature gravity conveyors and other devices for mechanical inspection and magnetic testing. They also segregate and count every magnet processed.

Three Times Faster

The mechanical inspection unit processes 2100 speaker magnets per hour. This is three times faster than any technician could visually inspect for defects, much less check the magnets for length, outside diameter, end-squareness and parallelism.

Steady travel of magnets through the machine is controlled by a switch inside the loading hopper. So long as the hopper is full and the switch steadily actuated, no additional magnets are conveyed to the machine. Only those magnets that measure up to all specifications pass entirely through the machine for eventual shipping.

Any magnet failing to pass size specifications at any of the stations is automatically rejected at that point. Solenoid gates control these segregation operations.

The electronically-controlled magnetic testing unit is located in line with the mechanical inspection unit and operates in much the same manner. It tests the output of about 1600 various sized speaker magnets per hour.

All automatic . . .

Tubing:

Smallest tubing made is barely visible to eye.

One of the smallest tubes in the world was seen—but just barely. It was recently made by Superior Tube Co. and shown to visitors at the Radio Engineering Show in New York.

The tube measures only 0.0014 in. in outer diameter and is barely visible to the naked eye. For this reason, it was displayed in a container of liquid and compressed gas was released through it. The stream of bubbles emerging from one end helped to locate the tube. Even so, some had difficulty seeing it.

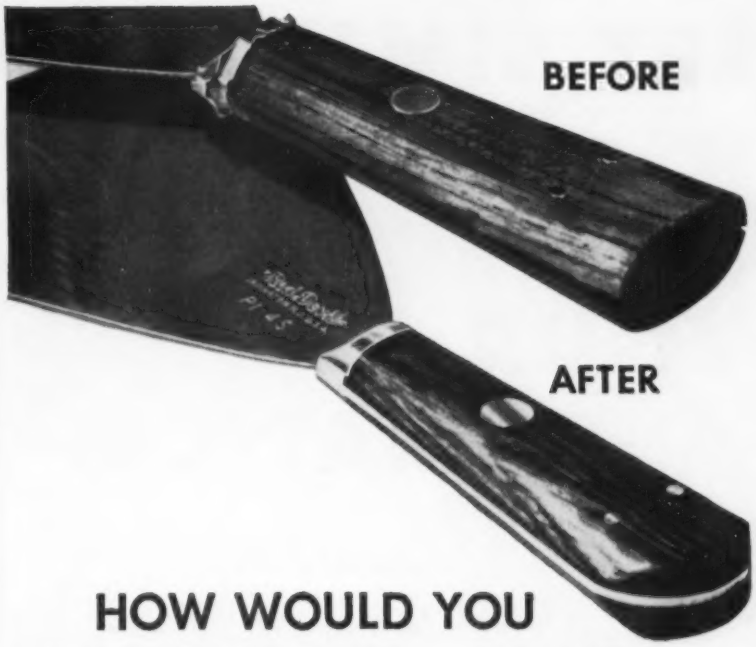
Interesting Comparisons

A bundle of 18,000 tubes could fit inside the bit of a man's pipe. A bundle of 25 equals the diameter of a 36-gage wire. The inner tube diameter is about one third the thickness of a human hair.

The tube is cold drawn from 2-in. diam seamless nickel tubing. It requires 43 separate drawing operations with many intermediate controlled atmosphere annealing operations. Precision diamond dies are used to draw sizes from 0.115 in. down.

No commercial use is known for this tiny tubing. However, Superior has gained valuable experience from its production. Superior also makes round or shaped tubing to precise tolerances in commercial sizes ranging from .010 to 2½-in. OD in more than 55 analyses.

Tube hardly noticed . . .



HOW WOULD YOU

SOLVE IT?

1 PRODUCTION PROBLEM. Using several set-up wheels to grind and finish putty knife handles proved to be a slow and costly method for Pioneer Tool division of "Red Devil" Tools at Bloomfield, New Jersey. Each set-up wheel lasted only one hour before it had to be recoated. To solve this problem, a 3M Representative made the following recommendation:

2 SOLUTION. He suggested that the manufacturer switch to the 3M Method using Three-M-ite Resin Bond Cloth Belts. This allowed operators to grind flash off white metal bolsters, finish brass rivets, shape and blend cocobolo wood handles and steel tangs to size—*in just one operation!*

3 RESULTS. An immediate increase in production with each belt finishing 1,900 handles. Smoother, more uniform finishes at lower unit costs. A 3M Representative can help you solve your grinding and finishing problems, too. His services are available without cost or obligation. Call him today.

Want more information?

3M ABRASIVES

from the world's largest coated abrasives machine

MADE IN U. S. A. BY MINNESOTA MINING AND MFG. CO. GENERAL OFFICES: ST. PAUL 6, MINN. IN CANADA: P.O. BOX 757, LONDON, ONTARIO. EXPORT SALES OFFICE: 99 PARK AVENUE, NEW YORK CITY. MAKERS OF "SCOTCH" PRESSURE-SENSITIVE TAPES, "SCOTCH" BRAND MAGNETIC TAPE "3M" ADHESIVES, "UNDERSEAL" RUBBER-IZED COATING, "SCOTCHLITE" REFLECTIVE SHEETING", SAFETY WALK" NON-SLIP SURFACING.

MINNESOTA MINING AND MFG. CO.
Dept. IA-45, St. Paul 6, Minn.

☐ Send me free booklet: "Case History Reports on 3M Abrasive Belts"

☐ Please have 3M Representative call

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

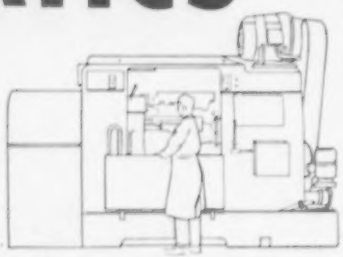
CITY.....ZONE...STATE.....

MY DISTRIBUTOR IS.....

LET SIMMONS REBUILD AND MODERNIZE YOUR AUTOMATICS

Investigate the important production, maintenance and tax savings of SIMMONS ENGINEERED REBUILDING for your: Lathes, Planers, Surface Grinders, Cylindrical Grinders, Vertical Millers, Openside Planers, Automatics, Vertical Boring Mills, Turret Lathes and Radial Drills.

A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1721 North Broadway, Albany 1, N. Y.



Write for Simmons Way... case histories of rebuilding jobs.

SIMMONS GIVES MACHINE TOOLS A NEW LEASE ON LIFE

Unconditional guarantee... our standard since 1910

PUNCHES·DIES

RIVET SETS · COMPRESSION RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service. Since 1903

Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. B for New Catalog 54

GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET CHICAGO 8, ILLINOIS

Forgings:

New Al alloys have improved strength properties.

New mechanical property guarantees are offered by Kaiser Aluminum & Chemical Corp. for aluminum hand forgings in alloys 7075-T6 and 2014-T6. Improved casting techniques and new hand forging practices at the company's Erie, Pa., plant have led to significant advances over generally accepted specifications.

The improved specifications apply to the firm's standard hand forgings as well as a new group, designated "special product." The special product group has higher guarantees in almost all mechanical properties including tensile strength, yield strength and elongation.

Offer Examples

Typical examples of the new guaranteed minimum mechanical properties are said to show marked improvement in comparison with the highest values generally specified at present.

For example, class 1 special product hand forgings in 2014-T6 will have minimum short transverse elongation (per cent in 2 in. or 4 x diameter) of 6 pct. Even standard forgings will be 4 pct although 3 pct is usually specified.

Classes 5 through 8 in the same alloy will have short transverse elongation of 3 to 4 pct in the special product group and 2 pct in the standard group. The generally accepted guaranteed is 1 pct.

In alloy 7075-T6, class 1 through 4, elongation ranges from 4 to 6 pct in special product forgings and is about 2 pct for the standard product. Here again 1 pct is usually specified.

Eliminate Porosity

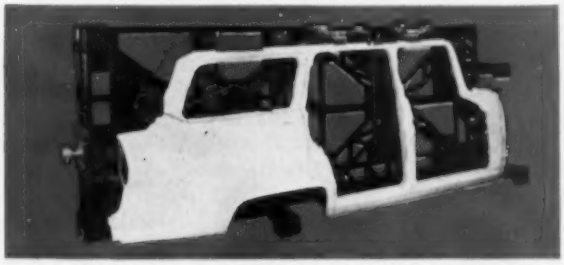
New degassing and metal handling techniques are said to eliminate the problem of unhealed porosity in forgings.

To overcome any disadvantages in spot checking by sampling, a policy of 100 pct reflectoscoping of all metal for hand forgings has been adopted both for the ingots or blooms and also for finished hand forgings at Erie.

FASTER ! EASIER !

CUT COSTS UP TO 50% WITH REN-ITE TOOLING PLASTIC

The trend is definitely to Ren-ite Tooling Plastics for lower costs. Look at your tooling requirements . . . you'll find that Ren-ite Tooling Plastics can replace steel or other metals at a fraction of your present cost. Efficiency of operation is another Ren-ite Plus.



This Ren-ite Master Body Checking fixture for a 1955 automobile reduced tooling weight from 2350 to 635 lbs. and cut costs approximately 50%. One of many Ren-ite tooling accomplishments.

Ren-ite the dependable dimensionally stable tooling plastic is a thermosetting resin used as a laminating plastic without heat or pressure for general tooling applications. Ren-ite is used successfully for models, prototypes, spotting racks, panels, forming dies, duplications as well as checking, welding, drill and router fixtures. Foundry applications are being developed.

Ren-ite research and engineering are available at no cost to you. No contract needed.

Ren•ite
PLASTICS, INC.
3181 South Cedar Road, Lansing 4, Michigan
Offices in Chicago, Cleveland, Detroit, Los Angeles, New York and St. Louis

C

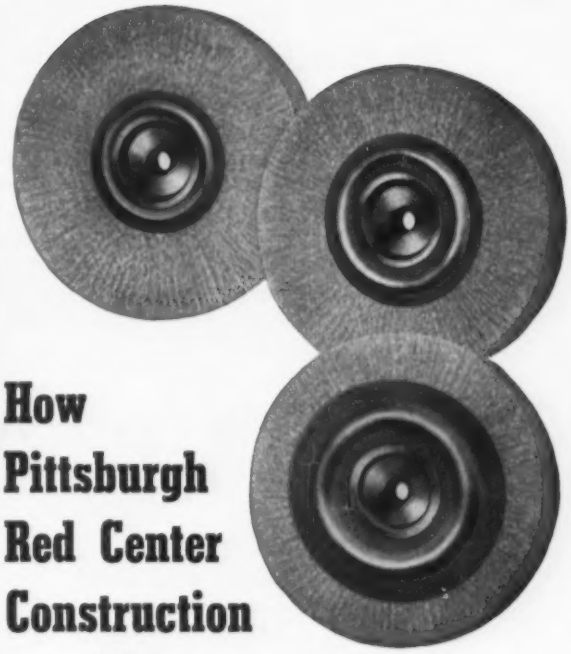
ELECTRIC FURNACE
STEEL CASTINGS

If you are interested in minimum machining and assembly costs — ease of welding — better distribution of metal — better strength and weight ratios — better fit — better performance — greater fatigue resistance — longer life and less replacement — you should be interested in "C" electric furnace steel castings because these foundry engineered castings give you steel at its best. And — by virtue of alloy and heat treating — they offer you a choice of mechanical properties to fit your specific needs.

Investigate!

Perhaps by cooperating with your engineers in details of design and pattern we may be able to help you achieve improved production at lower costs.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE, PENNA.



How Pittsburgh Red Center Construction Provides

Faster cutting while maintaining smooth finish • Freedom from shedding • Perfect balance • Longer life

In conventional brushes, when faster cutting action is desired, coarser wire is used. But increasing the wire gauge causes brittleness, destroying the wearing quality of the brush, and resulting in excessive scoring of the work.

Pittsburgh has solved this problem by maintaining the same ideal gauge wire in every brush, but increasing the fill and diameter of the hub and center plate of brushes designed for faster cutting. Thus, although cutting speed is increased, work remains unscored and the wire does not lose its inherent power to flex. These Red Center brushes last longer, maintain perfect balance throughout life, and do a better job all around.

This is just one example of superior Pittsburgh construction, engineered for both general and specific applications. For details of the complete line, write for free Catalog #54-W. Address: PITTSBURGH PLATE GLASS CO., *Brush Div.*, Dept. N-4, 3221 Frederick Ave., Baltimore 29, Maryland.

PITTSBURGH
PG *Power Driven* **BRUSHES**
BRUSHES • PAINTS • GLASS • CHEMICALS • PLASTICS • FIBER GLASS
PITTSBURGH PLATE GLASS COMPANY
IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

Unloading:

Cleanup buckets will speed ore handling operations.

Seven ore clean-up buckets designed especially for the new unloaders at U. S. Steel's South Works will be used in service on the Great Lakes this year.

The buckets are to be used to unload domestic iron ore from Lake boats. They are designed especially for the more difficult portion of the operation of cleaning up the ore from the floor of the hold under the decks, after the digging buckets have removed that portion of the cargo which is more readily accessible directly under the ship's hatch openings.

These clean-up buckets have two important design features. First, they open to a length of 20 ft, yet have a closed length of only 6½ ft. This closed length makes it possible to lower the bucket through the narrow hatch openings. Under the deck the jaws can be opened to a maximum spread of 20 ft, which in combination with the 10½ ft jaw width provides an overall clean-up area of 210 sq ft.

Design Features

A second feature of the bucket is its relatively low height of 15 ft when closed. Movable unloaders are designed for a minimum overall height and there are definite advantages in having clean-up and digging buckets stored on the unloader. Due to the limitations imposed by the available headroom space for storing the buckets on the unloader, the clean-up buckets were designed for a closed height of only 15 ft so both digging and clean-up buckets are readily available for interchangeable operation.

Opens at Right Angles

Each bucket has a nominal rated capacity of 20,000 lb when handling iron ore weighing 150 lb per cu ft. The weight of the empty bucket is 25,000 lb.

The arrangement of the operating cables at the bucket head permits opening the bucket at right angles to the direction of the trolley travel and parallel to the length of the Lake boats. Flat bottom reversible scoop trays will be used on all buckets.

Operate From Unloaders

Four of the new buckets will operate from new unloaders now in the process of fabrication by American Bridge Division of the United States Steel Corp. The unloaders will be equipped with two drum man type trolleys built by Dravo Corp., and will be installed on South Works' north ore docks. The other three buckets will be used on existing unloaders at the south ore dock.

Test — and be *sure* your material is . . .

You save metal and manpower by testing for drawing qualities and stretcher strain.

Tests thickness to ¼" for drawing ability . . . capacities up to 40,000 lbs. Simplified hydraulic controls. Widely used for steel and non-ferrous sheets and strips.

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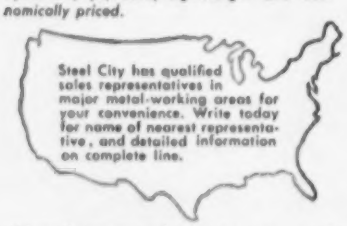
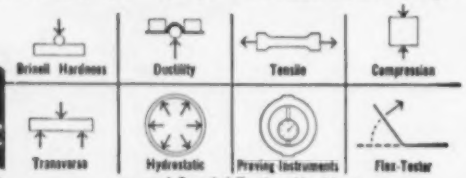
Quick yet non-destructive method to determine sheet metal suitable for forming parts . . . and need for roller levelling. Hand operated, portable, lightweight and economically priced.

(FLEX-TESTER)


Steel City has qualified sales representatives in major metal-working areas for your convenience. Write today for name of nearest representative, and detailed information on complete line.

Manufacturers of machines for testing physical properties of metals, including:

Steel City Testing Machines Inc.



8815 Lyndon Ave., Detroit 38, Mich.

. . . and Special Testing Machines.

Hydraulics:

Unit compensates for leakage, eliminates shock.

A new large capacity separator type accumulator capable of delivering 2130 cu in. of oil with a pressure drop of 10 pct has been developed by Superior Hydraulics Div. of Cleveland. The unit is designed to maintain constant pressure, eliminates shock and surges, and compensate for fluid leakages in hydraulic systems.

This cylindrical double shell accumulator incorporates a floating piston which transmits the pressure of the precharged gas to the working medium and prevents entrainment of the gas into the hydraulic fluid.

Uses Gas Under Pressure

Gas is introduced under pressure into the outer shell of the accumulator. In turn, the gas is permitted to enter the upper end of the inner cylinder. There it exerts its pressure against the floating aluminum piston.

The constant pressure of the gas against the piston forces it against the oil which enters the pressure balanced inner shell from the main hydraulic line. The pressure of the working medium in the outlet line is thereby maintained at constant pressure.

In this design, the outer shell acts not only as a gas container, but also as a protective cover to insure that damage inflicted through rough handling will not interfere with the free movement of the piston.

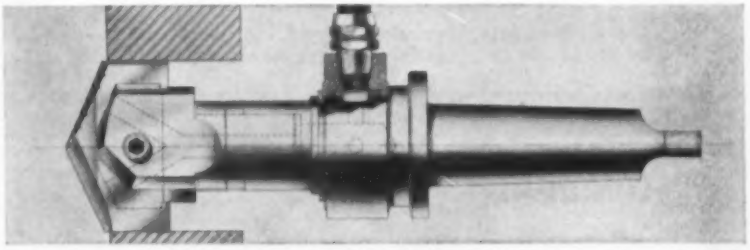
Slows Piston Travel

The piston is designed with a dashpot to decelerate the piston travel, thereby eliminating piston hammering, and makes the entire swept volume of the unit available for work. It is also equipped with spiral Teflon backup rings to reduce frictional wear and with standard "O" rings to prevent internal leakage and facilitate easy maintenance.

In addition, the piston has pressure balancing ports to provide equal pressure to either side of both rings which eliminates the tendency to extrude, and the possibility of pressure lock between the "O" rings. The temperature of the accumulator is maintained at the lowest possible level during rapid cycling, due to its low gas compression ratio.

This accumulator eliminates the necessity of a compressor and possible machine downtime which results from a malfunctioning component that is encountered in other types of installations. In addition, it permits the designer to simplify his design and lower installation costs.

These accumulators are designed for 2000 psi and will deliver 2310 cubic inches of oil with a pressure drop of 10 pct and hold a net gas capacity of 21,950 cu in.

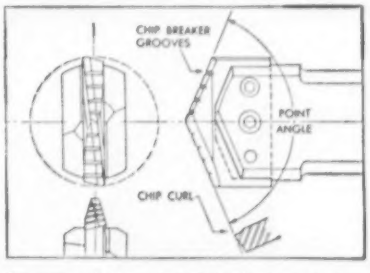


Reduce Costs with Gairing Spade Drills

For drilling large holes and holes in hard and tough materials, Gairing Conner-Type Spade Drills, in stock sizes from 1 to 5-inch diameter, offer many advantages. *They drill from the solid,* and keep on drilling without being retracted to clear them of chips. Their *performance* is based on the great strength of the assembled drills, and on the design of the drill point. Their *economical use* increases with their size, and is based on wide range of stock sizes and interchangeability in only eight sizes of holders.

Spade Drills Have Greater Strength

The spade drill below shows heavy cross sectional strength along a direct line between drill point and shank.



Compared to a twist drill, this design provides great resistance to *end thrust* (for better drilling from the solid), to *torque* (to lessen chipping and breaking through vibration), and to *bending*.

Drill Point Designed for Hard Work

Spade drill cutters are furnished finished ground with these features: *small dead center* minimizes end thrust, *cutting angles* (point angle and rake) provide better support of cutting edges, *chip breaker grooves* keep chips narrow, *chip curls*, ground parallel to cutting edges, break chips short.

A Rugged Tool for General Work

A rugged tool for all large hole drilling in tool rooms and tool and die shops and for shallow production drilling, where coolant can be applied in the conventional way, is shown at the left.

A Tool for Continuous Production

Oil hole drills, rotating or designed for the turret lathe, flush chips from the bottom of deeper holes on production work. Many such drills, like the one shown above with a special oil inductor holder, are made larger than standard for special applications.

Full data on standard drills and examples of deep hole drilling are shown in our Spade Drill Catalog. Write us, or call our representative.

THE GAIRING TOOL COMPANY
Tooling—Standard and Special
21224 Hoover Road, Detroit 32, Mich.

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TODAY
TOMORROW

CONTINENTAL

Serves Industry Everywhere

COMPLETE PLANTS designed, constructed, and equipped as an integrated unit for efficient and economical production.

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Tomorrow's Designs Today

SPECIAL EQUIPMENT industrial furnaces, ovens, gas generators, and dryers—all fuels—field or shop erected.

PRODUCTION LINES tailored to individual needs requiring minimum labor for maximum output.

CONTINENTAL

30 Years' Extensive Experience

insures prompt service in planning and production by experienced engineers who know industry's problems. Our numerous sales and service centers keep in constant touch throughout all phases of the work.

Write for Booklet No. 135

This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.

5242

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Controls:

System permits safer all-weather flying.

A long sought means of landing U. S. Navy airplanes safely aboard aircraft carriers despite adverse weather has been developed and tested by Bell Aircraft Corp. of Buffalo, New York, in cooperation with Navy scientists.

Bell Aircraft's new Automatic Carrier Landing System (ACLS), is capable of landing aircraft in conditions which would ordinarily force fighting carriers to suspend operations.

Permits "Hands Off" Landings

ACLS has been successfully tested at a Navy facility where several hundred fully automatic or "hands off" landings were demonstrated. Further tests are scheduled to be made soon aboard a carrier.

The accuracy with which landings have been made in tests so far, indicates that the ACLS may also be the answer to the all-weather flight problems of other military and civilian aircraft.

The need for such a system became evident during the Korean War when many attacks against the enemy were called off because of poor weather.

An additional advantage is the fact that the system can be used to land aircraft whose pilots are either wounded or overly fatigued after flying long missions.

Makes Difficult Landing

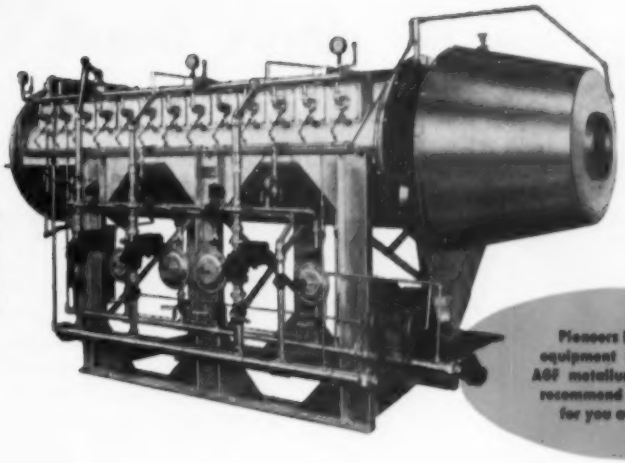
The most difficult single maneuver performed by naval aviators is the final approach and landing of modern high-speed aircraft aboard a carrier at sea. It is a complicated maneuver requiring the coordinated judgment, decision and action of both pilot and Landing Signal Officer.

During periods of poor visibility, the physical and psychological demands upon the two may become excessive. On these occasions satisfactory landings may become impossible. Bell Aircraft's ACLS was developed to alleviate just this difficulty.

Controlled Atmosphere Heat Treating at the Lowest Unit Cost

Use this continuous production furnace without modification for general and atmosphere work, including "Ni-Carb" ammonia-gas carburizing. Gentle tumbling action mixes the work and assures uniform heat treating.

Improved AGF Continuous Rotary Retort Furnaces



Pioneers in heat treating equipment for 77 years. Ask AGF metallurgical engineers to recommend proper equipment for you at no obligation.

Here are some of the many engineering improvements AGF Pioneers have made so that you can produce more pounds of work for every dollar invested in an AGF continuous rotary retort furnace. Less maintenance and operational cost than with any other furnace.

- **Automatic self-metering feed hopper reduces work handling costs.**
- **Better control of processing atmosphere and temperature.**
- **Improved high production capacity combustion system.**
- **Increased thermal efficiency because only the work enters and leaves the furnace. Baskets, trays, chains and other troublesome mechanisms are eliminated.**
- **Alloy life is increased because the alloy remains within the furnace heating chamber at all times.**

Sizes in production capacities up to 800 pounds per hour. Representatives in principal cities.

AMERICAN GAS FURNACE CO. PIONEERS 1878

AMERICAN GAS FURNACE CO.
1004 LAFAYETTE STREET
ELIZABETH 4, N. J.

Send me your Bulletin No. 870 which will help me produce a quality product at lowest cost.

NAME..... TITLE.....

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don't trust to luck...

when you can be sure with CUT STEEL!

Don't buy conventional types of abrasives and trust to luck to get exceptional cleaning results. For there's a revolutionary, new type of abrasive—CUT STEEL—that cleans like no other abrasive has ever cleaned! It isn't air-formed, cast or made from wire. Instead, it's cut from high quality, alloy steel. And, it does an incredibly fine job of cleaning!

CUT STEEL gives castings and forgings a gleaming, natural metallic appearance. Cleans up to twice as fast as other abrasives. Outlasts other abrasives. Holds maintenance costs to a minimum. Yet, Grade "A" CUT STEEL ***sells for less than most cast steel shot*** and Grade "B" ***costs no more than most malleable shot!***

So, don't trust to luck—change over to CUT STEEL and be *sure* of better, more economical cleaning. Send for samples, prices or a trial order—TODAY!

Sooner or later, you too, will change to CUT STEEL!

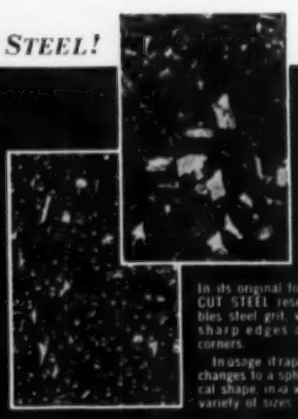
CUT STEEL
ABRASIVE

ANNEALSHOT and SUPER-ANNEALSHOT

PRODUCTS OF

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

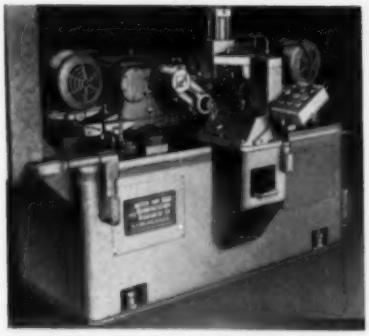


In its original form, CUT STEEL resembles steel grit with sharp edges and corners.

In usage it rapidly changes to a spherical shape in a wide variety of sizes.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 113 or 114



Bolt seat milling, cap splitting of connecting rods

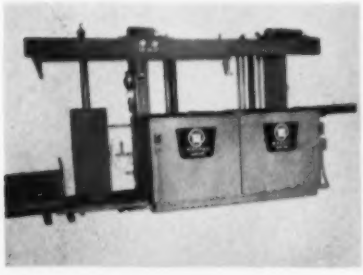
A duplex mill cuts by circular saw the cap from the connecting rod at the crankshaft end, when for economy connecting rods are produced with cap forged with the shank. Simultaneously, the top and bottom bolt seats are finish milled. The single arbor on each head has a triple-chip circular saw blade between straddle milling cutters, which makes simultaneous cutting and milling possible. Right and left-hand traveling milling heads approach simultaneously, and the circle formed by the crank-end of the connecting rod is cut in half and milled from two sides simultaneously. The geared milling heads are driven by 5 hp motors. *Motch & Merryweather Machinery Co.*

For more data circle No. 29 on postcard, p. 113.

Contour projector for checking small parts

Equally adaptable for either horizontal or vertical projection gaging, a portable bench-type contour projector is designed for economical checking of small parts. Parts to be inspected may be staged in simple holding fixtures for horizontal projection or may be placed on an easily-mounted glass stage, with the machine turned on end, for vertical projection. Kodak Projection Ektar lenses used in the machine are rigidly mounted and housed to provide the same degree of precision obtained in the larger Kodak contour projectors. Six magnifications are provided, with all lenses quickly interchangeable. *Eastman Kodak Co.*

For more data circle No. 30 on postcard, p. 113.



Cleaning method uses mechanical agitation of work

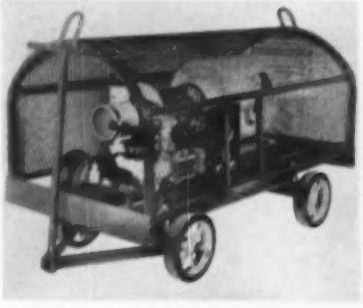
In the Aja Lif Automatic cleaning method the machine is equipped with pneumatic push device and air-lift loading of the work. The work is pushed at floor level onto a lifting roller platform, automatically raised to machine level, pushed onto similar platforms in the tanks. The push drive transfers each batch one step forward at each cycle. A timing device synchronizes the push drive with air-lift loading. Cleaning of work is accomplished by vigorous agitation in the cleaning solution, for the necessary length of time. *Magnus Chemical Co., Inc.*

For more data circle No. 31 on postcard, p. 113.

Dryer brings heat to the mold; saves drying time

New method of drying floor molds brings the heat to the mold, rather than taking the mold to the heat. A light, easily portable unit, requiring 3x6 ft of floor area, can be put into operation on a mold in less than 5 min. The machine is completely automatic and requires no attendant. Up to 4 days drying time can be saved by using this unit in drying large pit molds, the manufacturer states. Any drying temperature, and any time program can be achieved, automatically by turning a knob. Any drying depth can be obtained, automatically. The dryer burns commercial gas, requires no vents, smoke stacks or special outlets. *Milwaukee Shipbuilding Corp.*

For more data circle No. 32 on postcard, p. 113.



Turn Page

New mill on TIMKEN® bearings tapers 10′ x 33′ aluminum sheets for aircraft wings

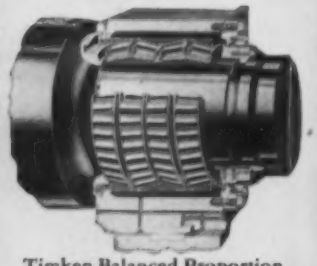
A 4-HIGH reversing mill, 23″ x 60″ x 144″, which tapers aluminum sheet and plate up to 10′ wide and 33′ long, is now in operation. This mill is used for the fabrication of tapered sheet and plate. Tapered sheet and plate products permit the fabrication of modern aircraft of increased speed and increased carrying capacity at no sacrifice in strength. Built by the Continental Foundry & Machine Company, this huge new rolling mill uses Timken® tapered roller bearings on back-up rolls, work rolls, screw-downs and breaker blocks.

Timken balanced proportion bearings give this mill the extreme precision required in such rolling operations. Timken balanced proportion bearings have load ratings up to 40% higher than the same-size bearings in older designs. In some mills, they increase bearing life expectancy almost three times. And the mill can be stopped and restarted without altering or relieving screwdown pressures.

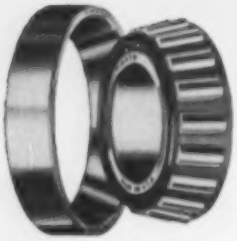
Timken bearings, because they're tapered, take both radial and thrust loads in any combination. They practically eliminate friction because they're designed by geometrical law to have true rolling motion. And made with extreme accuracy to conform to their design.

Always specify Timken bearings in the equipment you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



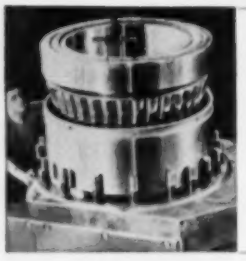
Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



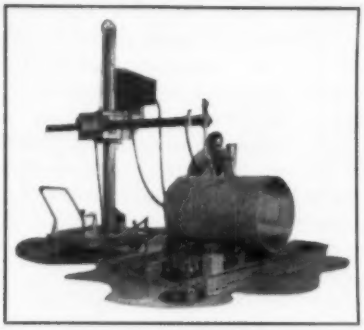
ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. nickel-rich Timken alloy steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION →✳←

Welding head manipulator works as robot pilot



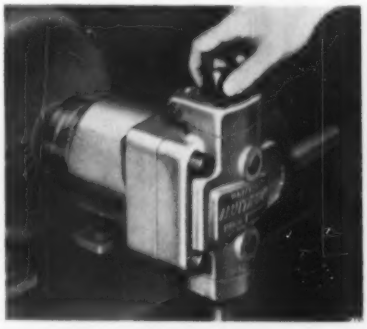
Function of the semi-automatic manipulator is to provide a low cost method for converting a semi-automatic submerged melt weld head into a highly productive tool. It works as a robot pilot—laying a weld without manual assistance. The semi-automatic unit is easily demountable and wheels may be left on the cabinet for manual applications. The new version of SAM is more compact and heavier. Boom and controls cabinet are mounted on a single column. Base is semicircular, has three jacks for raising the entire unit clear of the floor. SAM is available with hand or power lift for raising the weld tip to an arc height of 8 ft. Welding speeds are 0 to 120 fpm. *Pandjiris Weldment Co.*

For more data circle No. 33 on postcard, p. 113.

Vane pump features finger tip volume control

Named the Multipump, this versatile hydraulic pump will deliver variable volume at constant speed, or constant volume at variable speed. Finger tip volume control is as easy to turn as a radio dial and works independently of compensator. A compensator control works at all volumes. The pump is said to hold volume within ± 5 pct over desired pressure, and designed speed ranges. Delivers preset volume and preset pressure to system. It gives the results of cylinder control simply by addition of on-off valve; eliminates need for servo-control. Three basic sizes have capacities of 5, 15 and 25 gpm at 1200 rpm—all designed for 1000 psi continuous duty. *Denison Engineering Co.*

For more data circle No. 34 on postcard, p. 113.



Adaptable to seven different welding processes

Two versatile welders are said to be actually seven welding machines in one. They provide the operator with either ac or dc welding current at the flip of a switch. They can be used for metallic arc welding ac or dc, either straight or reverse. With the proper torch they can be used for inert-gas welding, ac or dc, and they are suited for automatic inert-gas welding. Can be used for Sigma welding. The use of spot-welding gun adapts them for fast, efficient spot welding. Both are equipped with the P&H Dial-lectric control: by turning a radio-like knob or stepping on an automobile accelerator type foot treadle the operator gets instant, stepless heat adjustment throughout the entire range. The units also have a built-in automatic gas and water shutoff for use with inert-gas processes. *Harnischfeger Corp.*

For more data circle No. 35 on postcard, p. 113.

Straightening press has two-way traveling head

This hydraulic press of 400-tons capacity and 24-in. stroke is equipped with a two way traveling head. It was designed to meet the user's individual production requirements for straightening large weldments and castings. The press consists of a large one-piece bed weldment with removable bolster plate; a welded steel bridge for supporting the traveling cylinders and power unit; two welded steel side housings containing the four columns and steel rollers; and a welded yoke that passes under the bed and receives one end of each of the four columns. Columns are pre-stressed, holding the whole traveling unit in rigid assembly. The ram is fitted with a guided platen on which the straightening fixtures are mounted. *American Steel Foundries, Elmes Engineering Div.*

For more data circle No. 36 on postcard, p. 113.

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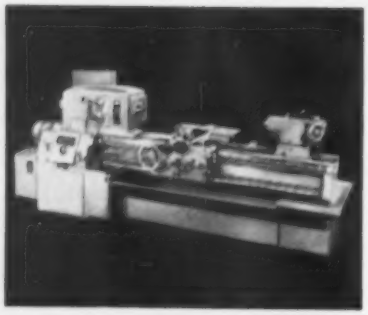


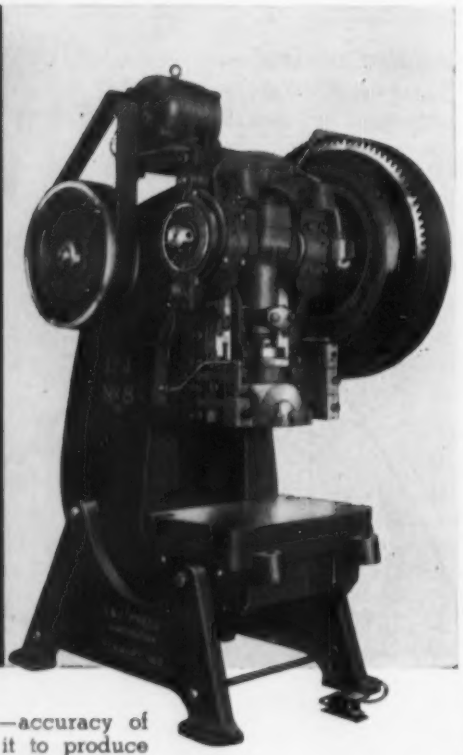
Lathe with speed preselection saves machining time

Basic in the design of the new Series 62 lathes is the Dyna-Shift headstock, with incorporated speed preselection to make possible further substantial savings in overall machining time. These savings are particularly evident where a succession of changes in work diameters is involved. The new Series is offered in four models, all with 20 hp main drive motor. Model 130 swings 13 in. over the cross slide, has a clearance diam of 20 in. Model 131 swings 16 in. with clearance of 24 in. Models 1130 and 1131 are provided with more accessory equipment for greater flexibility desired in toolroom work. *Monarch Machine Tool Co.*

For more data circle No. 37 on postcard, p. 113.

NEW L&J NO. 8 PRESS

FOR MORE PRODUCTION AT LOWER COSTS



The rigidity—versatility—accuracy of this new press enable it to produce more at lower costs. It provides a new concept of efficient press operation.

The air clutch is standard equipment on both geared and non-geared models. This provides easier and safer means for maximum practical speeds with shock-free, full-power operation. Alloy iron frame, long adjustable gibs, recessed crankshaft bearing caps, large air release—spring set brake and rugged ram adjusting screw with buttress thread and replaceable bronze seat are but a few of the features that will help to better your press operations.

Specifications

Capacity—90 tons. *Standard Stroke*—4". *Maximum Stroke* (to order)—8". *Strokes* per minute—40 (non-geared type 70). *Throat Depth* center of ram to frame—12½". *Die Space*—16½" to 24" (bed to ram, stroke down, adjustment up). *Bolster Plate Area*—38" x 24".

Write for Catalog—Fully describes all L&J O.B.I. Presses—21 geared and non-geared models. Capacities 8 to 90 tons. Also, 20 to 50 ton High Speed, Double Crank Straight Side Presses with speeds up to 450 s.p.m. Ask for Catalog L-12.

L & J Press Corporation, 1623 Sterling Ave., Elkhart, Ind.

Commercial blind rivets

This fastener is installed by one man from one side of the work economically and quickly. There is no bucking, hammering, twisting or exploding. A special gun pulls the stem of the rivet into the hollow shank, upsets a head on the blind side and fills the hole in the work—all in a split second. The rivets may be used in sandwich construction, box section, tubes, ducts and other hard-to-reach places. *Townsend Co.*

For more data circle No. 38 on postcard, p. 113.

Safe center coping wheel

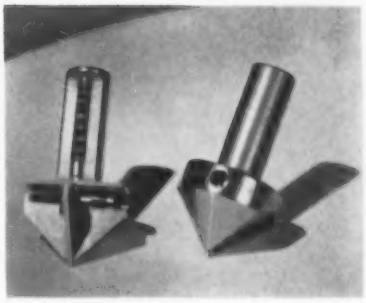
Center of a new coping wheel is made of layers of fiber glass material that are treated and pressed in such a way that it is absolutely rigid, flat and of high tensile strength. Cutting rim is molded at the same time, making it an integral part of the wheel. This increases the safety factor and permits employment of two full inches of usable cutting material. Advantages of the new wheel: runouts of less than 0.015 on 108 in. cuts; increased speed of cut. *Geo. H. Bullard Co., Inc.*

For more data circle No. 39 on postcard, p. 113.

Deburring tool operates without chatter

Basic principle involved in a new deburring tool is a controlled feed or thickness of the chip being removed. It is obtained by regulating the protrudence of the cutter blade beyond the body of the tool, with an adjusting screw projection through a hole in the cutter blade, that is in turn crosswise of the tool body. The adjustment is maintained by friction caused by a coil spring pressing against the adjusting screw and the bottom of the hole. The deburring tool for holes $\frac{1}{8}$ to 1 in. diam in any machinable material operates without chatter in any conventional drill press. May be used as hand tool. *Randles & Reynolds Machine Co.*

For more data circle No. 40 on postcard, p. 113.



Preventive maintenance

Fel-Pro C-5 Hi-Temp thread compound for stainless steel and high temperature applications up to 1800° F is used to prevent galling and seizing of studs, bolts and threaded assemblies, and as a preventive for galvanic pitting of stainless steel. C-5 is formulated on a special colloidal-copper base in a non-volatile and viscous carrier. In effect, it is said to copper-plate metal to prevent direct contact. It is non-corrosive. *Felt Products Mfg. Co.*

For more data circle No. 41 on postcard, p. 113.

Wire dereeler

Payoff of soft nonferrous material from drums or pails is possible with a new dereeling device. Wire in one continuous strand is loaded into a 20-in. diam drum or conventional 5 gal pail. The conical dereelers are provided with adjustable tension sheaves to permit the dereeling of fine or heavy wire at high or low speeds. There is freedom from tangle. *Coulter & McKenzie Machine Co.*

For more data circle No. 42 on postcard, p. 113.

Turn Page

Specify POPE

HEAVY DUTY WHEEL HEADS

"A"

Note the big precision bearings and the big shaft.

A pair of precision thrust bearings stabilize the shaft against any axial movement in either direction. (No end play)

The double row cylindrical roller bearings carry the radial loads with ease and at low temperature.

"B"

Power-Max 25 HP—available with standard No. 30, 40, 50 or 60 milling machine noses.

Taper mounting provides for precise individual preloading of the radial bearings.

Send us your specifications and ask for Catalog No. 59

POPE Heavy Duty Wheel-Head Spindles are designed for a wide variety of applications such as grinding, boring, milling, drilling and many other operations requiring PRECISION COMBINED WITH RUGGEDNESS in the spindles.

For continuous production and trouble-free operation THERE'S NOTHING LIKE A POPE SPINDLE WITH ROLLER BEARINGS.

No. 94

Specify POPE PRECISION SPINDLES

POPE MACHINERY CORPORATION

Red Circle Rolls for all Purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

Chilled Rolls
Alloy Iron Rolls
Moly Rolls
Nickel Chilled Rolls
Grain Rolls
Cold Rolls
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for
Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS • ROLLING MILL MACHINERY
GREY IRON CASTINGS

NEW EQUIPMENT

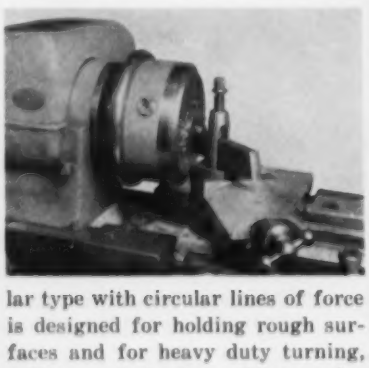
Ultrasonic cleaner

A portable ultrasonic cleaning installation for bench height work has a r-f generator and ultrasonic cleaning tank, solvent filtering and recirculation system. Parts holding basket and rinse spray nozzle are integral to the cleaning tank. The C100 is designed for use with organic grease solvents. Ultra-precision cleaning is possible for any parts capable of being immersed into the 11½x8x8 in. cleaning tank. *McKenna Laboratories.*

For more data circle No. 43 on postcard, p. 113.

Magnetic chuck line

Both rotary and rectangular permanent magnetic chucks comprise a new line made in Holland to Horton specifications. Two types of rotary chucks are available: parallel type with parallel lines of force running the entire width of the chuck face is used for holding small components and tin plates. Circular type with circular lines of force is designed for holding rough surfaces and for heavy duty turning, milling and shaping. Rectangular chucks feature a lower overall height which reduces size limitation on pieces to be held. The company claims it provides up to 18 pct greater holding power and 50 pct or more useable magnetic surface than other comparable types. *E. Horton & Son Co.*



For more data circle No. 44 on postcard, p. 113.

PHOSPHATE COATING WITH GRANODRAW FACILITATES COLD FORMING OPERATIONS

The drawing of wire, bars, tubing, stampings, shells, shell cases, cold heading, and many other cold forming operations—including the cold extrusion of steel—are greatly facilitated by the application of a "Granodraw" zinc phosphate coating and a suitable lubricant prior to working.

Write for Descriptive Folder
AMERICAN CHEMICAL PAINT CO.
AMBLER, PA.
Detroit, Mich Niles, Calif Windsor, Ont

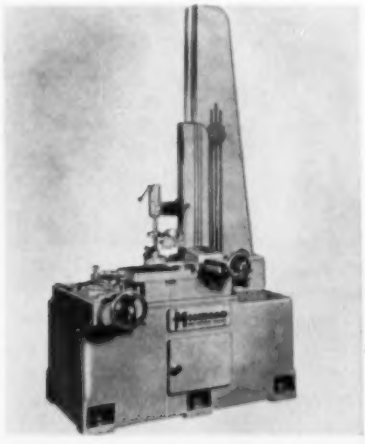
QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

Involute gear checker

New sine-line gear checker will check involute contours and tooth spacing of gears ranging from 0 to 24 in. diam on shafts up to 60 in. long. Utilizing the sine-bar principle to develop the tracing motion for indicating true involute, the 1124-P has the same rapid reading easy charting characteristics of all Michigan sine-line equipment. Only one master disk, combined with the sine-bar, is needed to obtain the proper ratio between



the master disk and the base diameter of the gear being checked. This is true for checking involutes on gears of any diametral pitch within the capacity of the machine. Setups from gear-to-gear require only a few seconds. *Michigan Tool Co.*

For more data circle No. 45 on postcard, p. 113.

Rustproofing

Internal metal surfaces of machines can be rustproofed during storage or shipments using Nucle-oils. These products are capable of two-phase protection of internal metal surfaces in closed or semi-closed systems. In Nucle-oils, protective properties of inhibited oils are combined with those of oil-soluble volatile rust inhibitors. The latter, during prolonged storage under static conditions, vaporizes from the surface of the oil and protects surfaces above the oil level. *Nox-Rust Div., Daubert Chemical Co.*

For more data circle No. 46 on postcard, p. 113.

Turn Page

Cut STAINLESS STEEL buying costs!

SPECIFY *MicroRold*®
SHEETS ROLLED TO THE LIGHT SIDE OF THE GAUGE RANGE

Washington Steel's production methods provide new economies in the purchase of stainless sheet. The controlled accuracy of gauge in the rolling process gives you more area per ton or the equivalent area with lesser weight. This close adherence to specified gauge also results in longer die life.

Washington Steel CORPORATION
WASHINGTON, PENNSYLVANIA

Your steel warehouse distributor will gladly tell you the Micro-Rold Story.

STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ¾–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.
FREE: "Selecting the Proper Die Head for the Job".

THE EASTERN MACHINE SCREW CORPORATION 21-41 Barclay St., New Haven, Conn.

for hard–tough–dense concrete repairs..

Non-Shrink

EMBECO PRE-MIXED MORTAR

Outlasts and outwears plain cement-sand patches because...

- *Does not shrink* upon hardening.
- Bonds tightly to old concrete and mortar.
- Tough iron particles serve as reinforcement.
- Density resists water and oil penetration.
- Higher compressive and impact-resistant strength.
- Hard—contains no asphalt.

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EMBECO PRE-MIXED MORTAR IS READY TO USE—you add only water.

Used to patch cracks, disintegrated and worn concrete floors, walks, steps, walls, etc.

Write for 4 page folder illustrating many applications.

Creators and Manufacturers of Products to Improve Concrete and Mortar

THE MASTER BUILDERS CO.

CLEVELAND 1 OHIO — Subsidiary of American Marietta Company — TORONTO 15, ONTARIO

"But nobody needs aspirin since we started using SUPERDIE!"

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

12,000-lb capacity

The RT-120 lift truck incorporates Hyster's overhead tilting mechanism said to reduce stress in the frame and tilt mechanism. Standard lift height of the model is 17½ ft. Optional heights are available ranging from 8 ft 2 in. to 24 ft.

Outside turning radius is 180 in. Overall width and wheelbase length both measure 86 in.—factors contributing to greater maneuverability. Maximum speed is over 19 mph in either forward or reverse. A 6-cylinder International Harvester engine and heavy duty, 7:50 x 15, 10-ply tires are featured. *Hyster Co.*

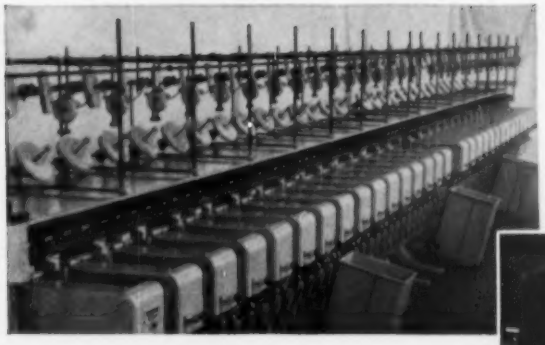
For more data circle No. 47 on postcard, p. 113.

High production brazing

An automatic brazing machine, trade-named Y-B Multiflame Brazer, has a performance record of brazing 7980 return bends in ½-in. copper tubing at the rate of

one joint per sec with only 3 rejects. The machines are offered in straight-line, rotary and station types; are so simply and ruggedly designed that maintenance is nil. *Youngberg Bros.*

For more data circle No. 48 on postcard, p. 113.



Perfect Partner for Metal

"U. S. Royalite saved us 66% in costs and gave us 7 outstanding advantages."

L. M. Sawtell
Foster Machine Co.
Westfield, Mass.

The giant machine shown above is a Foster Muschamp Model 66 bobbin winder. The empty bobbins (or pirns) which are fed along the top of the machine, drop off a belt into receivers known as pirn magazines. All day long these pirn magazines take a series of impacts at the maximum rate of one a minute. They must be TOUGH and DURABLE!

Duplicon, Inc., Westboro, Mass., specialists in combining plastics with metal, engineered, designed and produced this pirn magazine for Foster Machine Company by riveting easily formed, tough, versatile Royalite "2,000" to steel. In addition to the substantial material savings over all-steel construction, seven other advantages were quickly apparent:

- Lighter in weight.
- Noiseless during operation.
- Will not rust, even under high humidity.
- No painting necessary.
- Neater in appearance.
- Less expensive tooling.
- Greater flexibility.

U. S. Royalite "2,000" is the perfect running mate for all metals. It can be formed on low-cost tools, sawed, bent, punched or drilled, then bolted or riveted to metal. Learn all about this fabulous fabricating material by writing to:

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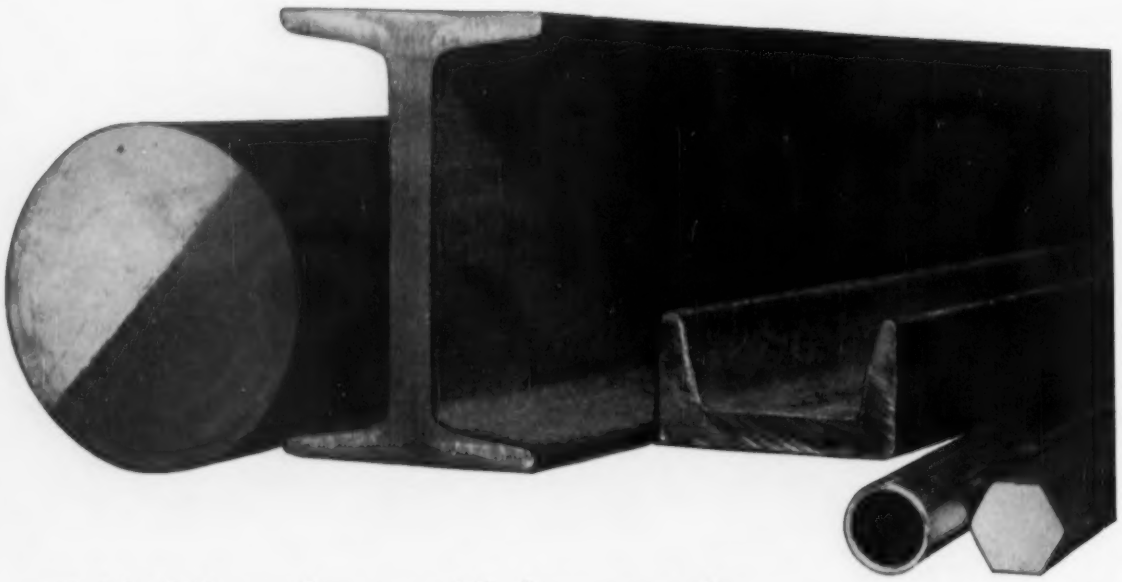
UNITED STATES RUBBER COMPANY
2638 NORTH PULASKI ROAD, CHICAGO 39, ILLINOIS

call Ryerson for steel carbon, alloy, stainless



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Whether you need a single piece or a truckload you can depend on prompt, personal service from your nearby Ryerson plant. So, for every kind of steel—when you need it—call Ryerson.

RYERSON CERTIFIED STEELS

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy & stainless steel, reinforcing, etc., also machinery & tools

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY...

High production has little effect on steel order backlogs . . . Domestic business pushing export into background . . . Mill records broken.

Backlogs Increasing . . . The steel boom is mushrooming. Some producers are operating far in excess of rated capacity without making any appreciable dent in order backlogs. Incoming business is running as much as 50 pct above capacity among the larger mills.

Steel ingot production this week may break the all-time record of over 2.32 million tons set in week of March 23, 1953. Production may reach a peak of 97-98 pct of capacity this year. Individual rolling mill records in many companies have been shattered. And more records will topple before the upsurge is over.

Export Demand . . . But production is not the only problem confronting the industry. Scrap supply is another. State and Defense departments, which favor free export of scrap, appear to be winning out over control-minded Commerce Department. Uncontrolled exports would further tighten domestic scrap supply.

Foreign steel consumers are up against it. They're short on productive capacity, long on demand. They need semi-finished from the U. S. to feed their finishing mills. But U. S. producers, up to their ears in domestic business, are not so interested today as several months ago.

As a result, export business from England, West Germany, Holland, France, and other countries is going begging. Within the last month to six weeks, a half million tons of foreign orders have been making the rounds here. The outlook: A steel shortage in Europe.

Major U. S. mills now find it hard to work up a lather over export business. They're more interested in accommodating their bread-and-butter domestic customers. Also, bulk of foreign demand is for low-profit semi-finished shapes.

Deliveries Lagging . . . The mills are still fighting a losing battle on the delivery front. List of products that have fallen behind on delivery is growing. Some producers are setting aside a month's production this summer in hope of becoming current.

State and Defense departments are taking a strong stand against scrap export restrictions. They favor giving our European allies what they need to maintain production. And they need scrap. Commerce Department favors controls, but more administration leaders are siding with State and Defense. U. S. steel producers are in the middle. They can't afford to press too strongly for controls, much as it would ease their problem.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,316	2,316*	2,255	1,622
Ingot Index (1947—49=100)	144.0	144.0*	140.0	101.0
Operating Rates				
Chicago	98.5	98.5*	97.0	76.0
Pittsburgh	97.0	97.0	94.0	73.0
Philadelphia	96.0	96.0	95.5	60.0
Valley	96.0	95.0	93.0	61.0
West	93.5	94.5*	92.5	76.5
Detroit	93.0	91.0	90.0	72.0
Buffalo	105.0	105.0	100.0	67.0
Cleveland	102.0	109.5*	98.0	64.0
Birmingham	90.0	90.5	87.5	46.0
S. Ohio River	89.0	92.0*	90.0	75.0
Wheeling	94.0	95.0	100.0	81.0
St. Louis	90.0	95.0	87.0	62.5
Northeast	79.5	97.5	95.0	54.0
Aggregate	96.0	96.0*	94.5	68.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$37.33	$37.00	$37.50	$25.17
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	33.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	91.375	91.00	90.625	99.50
Zinc, E. St. Louis	12.00	11.50–12.00	11.50	10.25

Mill Demand Tops in Midwest

Sustained pressure on mills from automotive, farm consumers . . . Extended backlogs . . . Delivery delays on most products . . . Eastern deliveries easing.

◆ SECTIONAL INFLUENCE of the midwestern automotive-agricultural axis is keeping the demand on mills in the Great Lakes area the tightest in the nation.

The sustained drive for steel from these consuming industries has resulted in extended backlogs and delivery delays in the Midwest. In slight contrast, eastern consumers are finding deliveries improving and becoming more current to a very moderate extent.

Rather than implying an easing of the market in the East, it dramatizes the rates of consumption of industries in Chicago, Detroit and Cleveland areas.

Two midwestern mills that have led the parade in full order books and high ingot rates are so far behind on cold-rolled sheet deliveries that they will accept no third quarter business until they get caught up.

This may result in some mills "dropping a month," a situation that has not occurred since the post strike days of 1952. This will only aggravate the situation in these steel-hungry markets, resulting in greater pressure elsewhere.

SHEETS AND STRIP . . . Many large consumers are hunting out brokers to meet immediate requirements, but without too much luck. They find that offerings are so often off gauge or off sheet size that they are reluctant to order for fear of stamping or finishing troubles. In the **Pittsburgh** area the situation is unchanged except for some consumer observations that deliveries are becoming somewhat more current. In the **East**, one large producer reports that his third quarter booking schedule is still on "an inquiry only" basis. In **Detroit**, two mills are far behind in deliveries. In **Cleveland**, sheet bookings are still well into third quarter.

BARS . . . **Pittsburgh** reports business in alloy bars is as strong as the mills are willing to go. Second quarter bookings are filled and a few third quarter orders are being accepted. Orders on hot-rolled carbon bars have been extended to 3-4 weeks. There's still no sign of a break for cold-finished and carbon bars in **Detroit**. Auto companies haven't booked any sizable third quarter orders yet but are expected to by April 15. Mill deliveries are running 3-4 weeks behind. On the **West Coast**, there's still an upswing in bars reported with automotive a major factor. In the **East**, one producer reports orders for carbon, alloy items are solid through June.

STAINLESS . . . Second quarter bookings are filled but third quarter business is being carefully considered in **Pittsburgh**. At the consumer level, deliveries are improving and becoming more current.

PLATES . . . In **Chicago**, there's some plate left for June delivery, but July is now booked practically solid. Ordering is moving out for August delivery with some customers trying to get September tonnage on the books. Inventory building has been stepped up. **Cleveland** reports that fabricators are having to go elsewhere for most of their supplies. Local mills are placing greater emphasis on rolling sheet. Demand for plate is almost as severe as for cold-rolled sheet. In the **East**, one producer is booked through June on his plate orders. **Pittsburgh** reports that linepipe demand for plate is increasing again.

STRUCTURALS AND SHAPES . . . One **eastern** producer reports demand continues good with orders for shapes still being accepted for June. In **Pittsburgh**, consumers are using more standards in place of wide-flange. Demand on all grades continues good. **West Coast** business is moving upward with highway and home construction industries leading the way. In **Chicago**, some items are still available for June with July bookings nearly complete. There's increased ordering for August with some consumers trying to get on the books for September. Inventory building is picking up.

PIPE AND TUBING . . . **Cleveland** reports tubing output now at capacity for oil diggers and showing a steady spurt in buying. Good second and third quarter seen with even some fourth quarter inventory building taking place. In **Chicago**, casing and tubing are at 90-120 days and moving out. Smaller lapweld items are at about 6 weeks. In the **East**, demand continues good with one producer reporting 5-6 weeks delivery on all sizes of pipe. In **Pittsburgh**, linepipe is again on the upswing.

WIRE PRODUCTS . . . Mills are booked through June in **Detroit** with automotive demand continuing strong. Some third quarter rod and wire orders are beginning to come in. Manufacturers wire is still running strong in **Pittsburgh**, but future automotive orders are off a bit over earlier placement. Construction wire is expected to improve during May and June. **Cleveland** reports merchant wire seasonal spurt is still coming. Welded wire fabric production is at capacity through third quarter with good outlook for fourth quarter.

WAREHOUSE . . . **Chicago** warehouses are receiving orders for plate in fair tonnages from mills having spurt shortages. Some warehouses can get delivery out in 4 hours. Business levels exceeding last year are reported. Warehouse business in **Pittsburgh** is reported better than at anytime since 1953.

Purchasing Agent's Checklist

NICKEL: Next 3-6 mos. may prove crucial ..... p. 60

AUTOMOTIVE: Future model changes cost millions, are planned years in advance ..... p. 68

STEEL: Diversified production needed in West to stimulate new industries ..... p. 77

MACHINE TOOLS: New orders coming in at over $60 million a month ..... p. 79

Comparison of Prices

(Effective Apr. 12, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Apr. 12 1955	Apr. 5 1955	Mar. 15 1955	Apr. 13 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.613
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	Apr. 12 1955	Apr. 5 1955	Mar. 15 1955	Apr. 13 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$38.50	$38.50	$38.50	$26.50
No. 1 steel, Phila. area	37.00	37.00	38.50	21.50
No. 1 steel, Chicago	36.50	35.50	35.50	27.50
No. 1 bundles, Detroit	29.00	29.00	29.00	17.50
Low phos., Youngstown	39.50	37.50	37.50	31.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	41.50
No. 1 mach'y cast, Philadel'a	44.50	44.50	44.50	39.50
No. 1 mach'y cast, Chicago	48.00	47.00	46.50	39.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$37.33	$37.00	$37.50	$25.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	*$13.00*	$13.05*	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	33.00	30.00
Copper, Lake, Conn.	36.00	36.00	33.00	30.00
Tin, Straits, New York	91.375	91.00	90.625	99.50
Zinc, East St. Louis	12.00	11.75‡	11.50	10.25
Lead, St. Louis	14.80	14.80	14.80	13.80
Aluminum, virgin in.	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	68.00
Magnesium, ingot	29.25	29.25	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 159→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$58.00	$58.50	$59.00	$59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *V1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1*, *G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	25.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	35.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	45.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4* Philadelphia, *D3*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*, Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A1*, Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D3*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*, Philadelphia, *D3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*, Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse *C11*.

Chicago Price Breaks Upward

Mill sales advance prices of steelmaking grades, bring wave of broker buying . . . St. Louis reports increase in prices, tight supply . . . East holds firm.

◆ THE SCRAP market showed new strength this week as soaring steel production seemed to be making itself felt again.

In Chicago, mill sales in steelmaking grades brought a flurry of broker buying. Prices of most grades advanced $1. Railroad scrap, which had been going out of the district, was in strong demand and the whole market had a healthy look.

The St. Louis price for No. 1 heavy melting held steady but a definite supply pinch was being felt in the area. Most blast furnace and foundry grades registered gains of 50¢ to $1.

Reports from Washington indicate that deferring of action on export restrictions is the result of a definite split within the government. The feeling persists at the Commerce Dept. that curbs on scrap shipments should be sufficiently tight to protect American steel producers. On the other hand, the Council on Foreign Economic Policy is concerned over the possibility that friendly foreign governments will be antagonized if scrap shipments are severely restricted. And so discussions continue.

On the strength of Chicago gains, THE IRON AGE Heavy Melting Steel Scrap Composite moved up 33¢ and is now at $37.33 per gross ton.

Pittsburgh . . . The market is going through an uneasy period. In spite of an extremely high operating rate, mills are staying out of the market. An independent mill has increased tonnages on an old order at $38 for local scrap and $39 for "out of district" material. Activity for blast furnace grades is nil, according to reports from trade sources.

Chicago . . . A scattering of mill sales over the week advanced steel making grades, railroad scrap and turnings and brought a fresh wave of broker buying. Railroad scrap, which has been moving out of the area in past weeks, is in strong demand. The immediate market outlook is strong. Despite movement of No. 2 bundles out of fringe areas normally feeding the Chicago market, strong stocks in the area have held that price at $25 and this was reinforced by further mill buying at that price during the week. Similarly, No. 2 heavy melting, though it advanced $1 the week previous, was still available at the old price.

Philadelphia . . . Prices are holding firm in the district with a generally quiet market. No. 1 heavy melting price remains at $37.50 tops. One major consumer has been out of the buying picture for several weeks. Mill consumption continues at a high level. Interest remains centered on possible export regulations now under discussion in Washington. If controls fail to materialize, it is expected that some tightening in the domestic buying picture will develop.

New York . . . Scrap movements continued at a lively rate and prices of steelmaking grades held firm. New York brokers are optimistic about the prospects for relatively free export movement in the future and continued heavy traffic is seen assured. Reports at this time indicate that the scrap supply is matching demand. All in all, the market looks active and strong.

Detroit . . . The scrap market is marking time here this week. No new buys of major significance, either locally or outside, were reported. Two firms have placed small orders, but at no advance in price. Orders are limited because of substantial mill inventories. Low phos. price is based on purchases of foundry steel.

Cleveland . . . Market remained quiet last week with only one substantial buy in the Valley at prevailing top price of $38 for No. 1 heavy melting. Overall market on No. 1 grades firm but No. 2 weakening both in Cleveland and the Valley. Major markets now are in non-integrated producers without hot metal. Foundry grades still firm but volume tapering off, market inquiries show.

St. Louis . . . Too many mills after too little prime grades caused advances of 50¢ to $1 per ton for RR material, and secondary items advanced sympathetically. Following advances by a Kansas City mill of cast iron grades, prices here were of necessity upped $1 per ton.

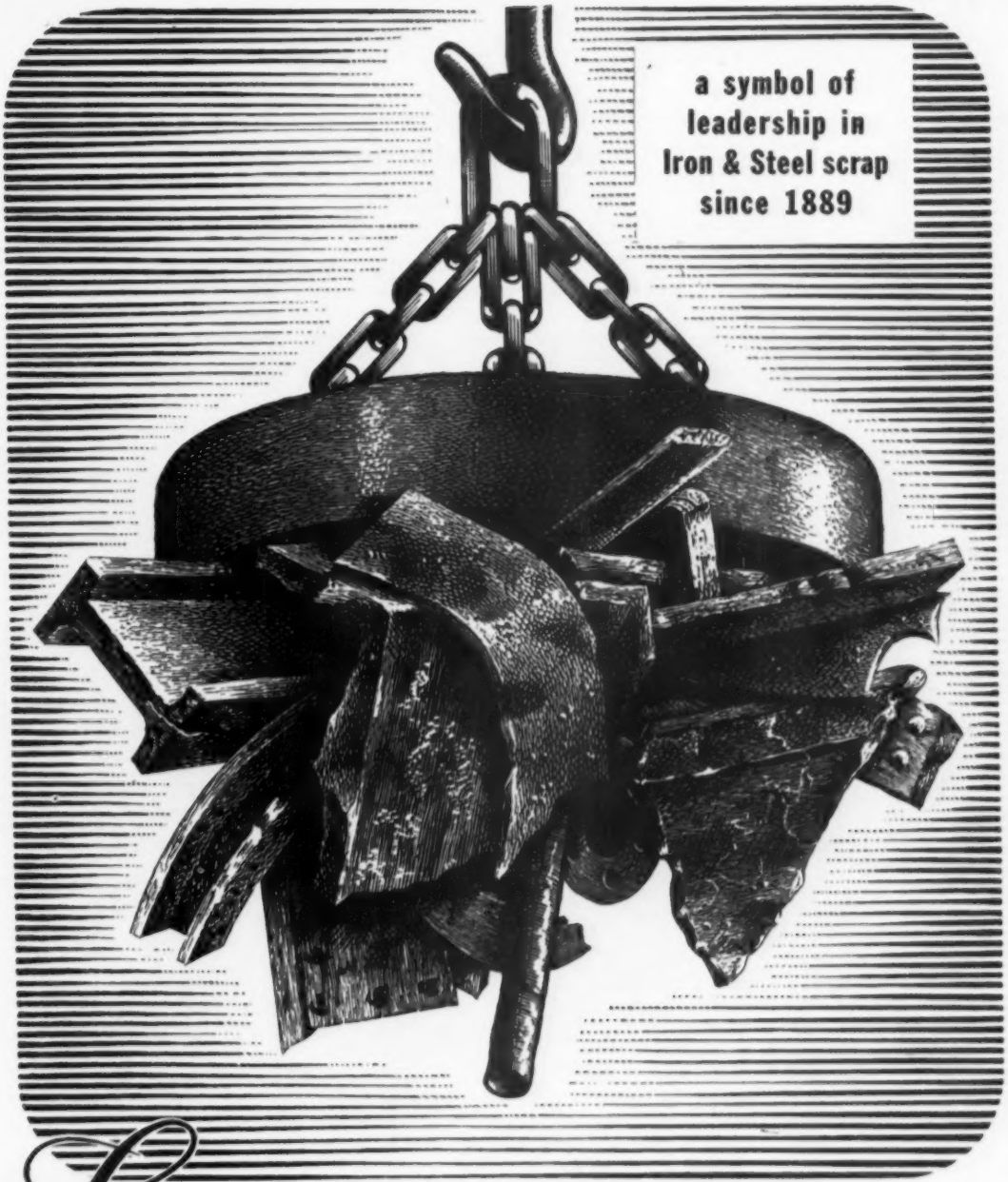
Cincinnati . . . Market was at least active point of the year last week with no major orders and prices unchanged. Foundry business showing continued life. Customers up and down Ohio River who usually take up some slack during similar periods now uninterested.

Birmingham . . . Dealers report scrap coming into the yards in greater quantities this week than for several weeks past, but that much of it is automobile scrap good principally for No. 2 bundles, which have been in very little demand. The result is this type of scrap is stacking up. Brokers were completing deliveries of March purchases by mills this week and the few sales of blast furnace grades were at unchanged prices. A $1 increase in electric furnace bundles last week was not maintained and they dropped back to the old price. The cast market was unchanged.

Buffalo . . . Scrap market in Buffalo was on the quiet side, with most shipping done on orders. Cast grades were a little weaker and prices were off $1 on No. 1 machinery cast and No. 1 cupola cast.

Boston . . . Moderate activity at lower prices as export continues to be the backbone of a quiet market. Prices declined again. Eastern Pennsylvania business has come almost to a standstill.

West Coast . . . Everything is quiet on all three fronts—Los Angeles, San Francisco, and Seattle. Export activity continues fairly brisk and several sources contend some dealers specializing in exports are doing some stockpiling in the hope export prices will move higher.



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READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.

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BIRMINGHAM, ALA.	DETROIT, MICHIGAN	PITTSBURGH, PENNA.
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BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

Scrap Prices *(Effective Apr. 18, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and ms. turns.	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs, plate	41.00 to 42.00
Heavy turnings	35.00 to 36.00
No. 1 RR. hvy. melting	40.50 to 41.50
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	51.00 to 52.00
RR. steel wheels	45.00 to 46.00
RR. spring steel	45.00 to 46.00
RR. couplers and knuckles	45.00 to 46.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 factory bundles	37.00 to 38.00
No. 1 dealers' bundles	36.00 to 37.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs, plate	39.00 to 40.00
Low phos. 3 ft and under	38.00 to 39.00
No. 1 RR. hvy. melting	39.00 to 40.50
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	52.00 to 53.00
Rails 2 ft and under	51.00 to 52.00
Locomotive tires, cut	38.00 to 39.00
Cut bolsters & side frames	39.00 to 40.00
Angles and splice bars	45.00 to 46.00
RR. steel car axles	42.00 to 44.00
RR. couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	47.00 to 49.00
Cupola cast.	42.00 to 44.00
Heavy breakable cast.	34.00 to 36.00
Cast iron brake shoes	35.00 to 36.00
Cast iron car wheels	38.00 to 39.00
Malleable	46.00 to 47.00
Stove plate	37.00 to 38.00

Philadelphia Area

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	36.50 to 37.50
No. 2 bundles	29.00 to 30.00
Machine shop turn.	21.50 to 22.50
Mixed bor. short turn.	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Clean cast chem. borings	28.00 to 29.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 2 ft and under	41.00 to 42.00
Low phos. punch'gs	41.00 to 42.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	35.00 to 36.00
RR. steel wheels	41.50 to 42.50
RR. spring steel	41.50 to 42.50
Rails 18 in. and under	51.00 to 52.00
Cupola cast.	36.00 to 38.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 26.00
Shoveling turnings	24.00 to 26.00
Cast iron borings	23.00 to 25.00
Cut struct'r'l & plates, 2 ft & under	42.00 to 43.00
Drop forge flashings	35.00 to 36.00
Low phos. punch'gs, plate	37.00 to 38.00
Foundry steel, 2 ft & under	40.50 to 41.50
No. 1 RR. heavy melting	36.00 to 37.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Railroad grate bars	37.00 to 38.00
Steel axle turnings	37.00 to 38.00
Railroad cast.	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	43.00 to 44.00
Malleable	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. plate	39.00 to 40.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 busheling	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	25.50 to 26.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	34.00 to 35.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles, openhearth	28.50 to 29.50
No. 2 bundles	21.00 to 22.00
New busheling	28.00 to 29.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.50 to 16.50
Shoveling turnings	16.50 to 17.50
Cast iron borings	16.50 to 17.50
Low phos. punch'gs, plate	32.00 to 33.00
No. 1 cupola cast.	36.00 to 38.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	32.00 to 33.00
Automotive cast.	40.00 to 42.50

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	16.00 to 17.00
Cast iron borings	17.50 to 18.50
Shoveling turnings	17.50 to 18.50
No. 1 RR. hvy. melting	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	48.00 to 49.00
Locomotive, tires uncut	36.50 to 37.50
Angles and splice bars	36.50 to 37.50
Std. steel car axles	36.00 to 37.00
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	36.00 to 37.00
Malleable	36.00 to 37.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	26.00 to 27.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and short turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Clean cast chem. borings	17.00 to 18.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.50
No. 2 hvy. melting	28.50
No. 2 bundles	$24.00 to 25.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	37.00 to 39.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	31.00 to 32.00
Heavy breakable cast.	31.00 to 32.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
Angles & splice bars	40.00 to 41.00
Rerolling rails	43.00 to 44.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos., 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	25.00
No. 1 bundles	26.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	8.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	27.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	30.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	$41.00 to 42.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Short steel turnings	$16.00 to 17.00
Mixed bor. and turn.	16.00 to 17.00
Rails, rerolling	43.00
Cast scrap	42.00 to 45.00

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Offices in principal cities listed in Classified Directory.

OHIO
OHIO WELDED MAGNETS. 39 to 65" diameter. Lightweight models in 39 & 45". 6-coil types in 46, 55, 65"; 8-coil in 55 & 65". Weld on top where it can't get dented in. Also capsule coil over 45".
OHIO BOLTED MAGNETS. 12 to 65" diameter. 6-coil types in 39 to 65"; 8-coil in 55 & 65". Strap copper coils over 39". Bolts protected in recessed wells. Also capsule coil over 45".
OHIO BASKET MAGNETS. 55 & 65" 4-coil, & 65" 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45".
A-7899

ohio ELECTRIC

CHESTER BLAND
President

THE OHIO ELECTRIC MFG. CO.
5400 DUNHAM RD. • CLEVELAND, OHIO

Ohio Also Makes Separation Magnets • Heavy-Duty Electric Hoists • Nail Making Machines • Fractional Horsepower, Shell and Torque Motors • Precision Threaded Parts for Aircraft Engine Manufacturers

Price Pressure Hits Zinc

Zinc price rise highlights fact that inflationary forces are exerting more pressure on nonferrous markets than elsewhere in economy . . . Lead not affected.

◆ ZINC PRICE HIKE last week provided further evidence that inflationary forces are exerting more pressure on the nonferrous market than anywhere else in the economy. The half cent per lb zinc price increase put this metal in the same category with aluminum, copper and magnesium——all have been subjected to price rises since the beginning of the year.

And there's no assurance the price spiraling trend is over, though zinc is probably stabilized for the time being.

ZINC . . . As of the middle of last week all zinc producers were quoting the new higher price which moved Primed Western, f.o.b., East St. Louis, to 12¢ per lb.

Sensing the possibility that prices might be jacked up—a feeling that was further stimulated by a news commentator's tip earlier—zinc buyers entered the market heavily early in the week to get what they needed before prices were upped. As a result, the market quieted down considerably at the end of the week, though demand for Special High was strong.

Market is expected to remain calm for a short while, although the government will soon be making its stockpile purchases for June.

LEAD . . . Increase in zinc prices had no effect on the lead market. Demand remains firm. For the week ended Apr. 6 domestic lead sales amounted to about 10,680 tons compared with 9780 tons the previous week. Last week's lead sales were the highest since early in February.

ALUMINUM . . . Production of primary aluminum continued at a high rate in February, totaling 116,236 tons. This was below production in the longer month of January which amounted to 128,203 tons, but was better than the February '54 figure of 110,483. Output in the first 2 months of this year amounts to 17,709 tons more than for the same period in '54—an increase of nearly 8 pct.

Shipments of aluminum mill products also were down slightly from January figures with the exception of castings, extruded products and ever-gaining foil. Shipments of foil in February amounted to 7985 tons compared with 7738 tons in January and only 5546 tons in February '54.

Following is a breakdown on mill product shipments for February and January:

ALUMINUM MILL PRODUCT SHIPMENTS
NET TONS

	Feb. '55	Jan. '55
Sheet and Plate, total	50,832	52,188
Non-Heat-Treatable	39,126	40,221
Heat-Treatable	11,706	11,967
Foil	7,985	7,738
Extruded Products, total	15,121	14,510
Soft Alloys	13,253	12,639
Hard Alloys	1,868	1,871
Tube, Drawn, total	3,193	3,267
Soft Alloys	3,010	3,110
Hard Alloys	183	158
Rod & Bar, Rolled	6,312	6,632
ACSR & Cable, Bare	4,830	4,880
Wire, Other than Conductor	1,723	2,098
Forgings	1,869	1,969
Castings, total	15,167	14,635
Sand	873	791
Permanent Mold	6,994	6,867
Die	7,390	6,976

Demand for secondary aluminum continues to be firm and there is no sign as yet of the customary seasonal wane in orders. With the economic recovery now reaching boom proportions, the odds are the dip in demand for secondary won't come so soon as was expected nor will it be so sharp. It is also apparent that the government's action in diverting aluminum stockpile shipments to industry is helping the market.

MAGNESIUM . . . Primary magnesium ingot production in February amounted to 4646 tons, a drop of 8.7 pct from the longer month of January. And in line with forecasts that magnesium output this year would be below the '54 level, production in February was down 20.7 pct from same month a year ago, according to latest figures from the Magnesium Assn.

But shipments of wrought magnesium products in February were up a whopping 56 pct from February '54. Total magnesium product shipments in February amounted to 824 tons compared with 888 tons in January. Reports indicate that sales for February exceeded production by about 250 tons.

COPPER . . . Total quantity of copper-base alloy ingots which will be licensed by the government for export in the current quarter is 1000 short tons. Previously Commerce Dept. had set no export quota on this material. The new action is another step by the government to help ease the critical copper shortage.

Ingots now are placed under the same policy of quantitative export control as that established in February for copper scrap and copper-base alloy scrap.

In another action, Commerce Dept. stated that license applications covering new and old copper scrap (Sched. B No. 641300), new and old copper-base alloy scrap (B No. 644000), and copper-base alloy ingots and other crude forms (B No. 644100) must be filed before June 1 to be considered for second-quarter export licensing.

TITANIUM . . . Meeting was scheduled for this week between titanium producers and fabricators and Business & Defense Services Administration officials with the idea of reviewing the industry's problems and possibly setting up plans for new titanium stockpile specifications. BDSA is also admittedly concerned over the slow pace at which development of titanium products for civilian use is moving.

Office of Defense Mobilization has granted E. I. DuPont De Nemours & Co. fast tax amortization of 90 pct of the $40 million cost of facilities to produce titanium sponge at Johnsonville, Tenn.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Apr. 6	Apr. 7	Apr. 8	Apr. 9	Apr. 11	Apr. 12
Copper, electro, Conn.	36.00	36.00	....	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	....	36.00	36.00	36.00
Tin, Straits, New York	91.375	91.50	....	....	91.375	91.375*
Zinc, East St. Louis	12.00	12.00	....	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	....	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ⅛-11/32 in., 63.5¢ to 50.1¢; ⅝-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 59¢; 3/16 in., 60¢; ½ in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ⅛ to 0.311 in., 79¢; ⅜ to ¾ in., 62.5¢; 1¼ to 1.749 in., 59¢; 2½ to 5 in., 54.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 2.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 9.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¾ to 5/16 in., $1.46; 5/16 to ⅝ in., $1.32; ½ to ⅝ in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $9; Forgings, $9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		85	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	52.79		54.86
Copper, h-r	54.76	51.11	
Copper, drawn		52.36	
Low brass	49.75	49.69	
Yellow brass	46.27	46.21	
Red brass	50.99	50.93	
Naval brass		44.30	45.56
Leaded brass			43.09
Com. bronze	52.78	52.72	
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.53	
Muntz metal	48.14	43.95	45.20
Ni silver, 10 pct	60.20	63.28	66.34

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
Strip $1.74
Rod, bar, wire 1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 23.20
Aluminum pig 21.50
Antimony, American, Laredo, Tex. 28.50
Beryllium copper, per lb conta'd Be. $40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $71.50
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 36.00
Copper, Lake, delivered 36.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.8%, dollars per troy oz. .. $2.25
Iridium, dollars per troy oz. $110 to $120
Lead, St. Louis 14.80
Lead, New York 15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 28.50
ingot 29.25
Magnesium, sticks, 100 to 500 lb ... 49.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $317 to $320
Nickel electro, f.o.b. N. Y. warehouse 67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. .. $18 to $20
Platinum, dollars per troy oz. .. $76 to $78
Silver, New York, cents per troy oz. 87.00
Tin, New York 91.375
Titanium, sponge, grade A-1, ... $3.95
Zinc, East St. Louis 12.00
Zinc, New York 12.50
Zirconium copper, 50 pct $6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 37.00
No. 120 ..... 36.50
No. 123 ..... 36.00
80-10-10 ingot
No. 305 ..... 41.00
No. 315 ..... 38.75
88-10-2 ingot
No. 210 ..... 50.75
No. 215 ..... 47.25
No. 245 ..... 42.25
Yellow ingot
No. 405 ..... 32.25
Manganese bronze
No. 421 ..... 34.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 31.50-32.50
0.60 copper, max. 31.25-32.25
Piston alloys (No. 122 type) 29.00-30.00
No. 12 alum. (No. 2 grade) 29.25-30.25
108 alloy 29.00-30.00
195 alloy 30.00-31.00
13 alloy (0.60 copper max.) 31.25-32.25
ASX-679 ..... 29.00-30.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½% 30.50-31.50
Grade 2—92-95% 30.00-30.50
Grade 3—90-92% 29.00-29.50
Grade 4—85-90% 28.00-28.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper
Cast, oval, 15 in. or longer 44.92
Electrodeposited 39.78
Flat rolled 45.42
Brass, 80-20
Cast, oval, 15 in. or longer 43.515
Zinc, flat cast 20.25
Ball, anodes 18.50
Nickel, 99 pct plus
Cast 90.50*
Cadmium $1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63.00
Copper sulphate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 31.25*
Nickel chloride, 300 to 400 lb 43.50*
Silver cyanide, 100 oz. lots, per oz. 75½
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 54.30
*Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	23⅞	22
Red brass	28⅛	27⅝
Comm. bronze	29¼	28½
Mang. bronze	22 1/6	21⅝
Yellow brass rod ends	23⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 35½
No. 2 copper wire 34
Light copper 32¼
*Refinery brass 31
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 35 —35⅛
No. 2 copper wire 33
Light copper 31¼
No. 1 composition 28½
No. 1 comp. turnings 28
Rolled brass 21½
Brass pipe 21
Radiators 22½

Aluminum

Mixed old cast ..... 17½—18⅛
Mixed new clips ..... 18 —20
Mixed turnings, dry ..... 17½—19

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire 32 —32½
No. 2 heavy copper and wire. 30 —31
Light copper ..... 29 —29½
New type shell cuttings ..... 29 —29½
Auto radiators (unsweated) .. 20 —20⅝
No. 1 composition ..... 26 —26½
No. 1 composition turnings .. 25 —25½
Unlined red car boxes ..... 20 —20½
Cocks and faucets ..... 21 —21⅛
Mixed heavy yellow brass .. 17½—18
Old rolled brass ..... 18½—19
Brass pipe ..... 20 —20½
New soft brass clippings 21½
Brass rod ends 19½
No. 1 brass rod turnings 19

Aluminum

Alum. pistons and struts .... 11½—12⅛
Aluminum crankcases ..... 15½—16
1100 (2S) aluminum clippings 13 —13¼
Old sheet and utensils ..... 14 —14⅛
Borings and turnings ..... 9½—10
Misc. cast aluminum ..... 14½—15
2024 (24s) clippings ..... 15 —15⅛

Zinc

New zinc clippings ..... 6 — 6½
Old zinc ..... 4¾— 5
Zinc routings ..... 3¼— 3½
Old die cast scrap ..... 3¼— 3⅜

Nickel and Monel

Pure nickel clippings 57
Clean nickel turnings 40
Nickel anodes 57
Nickel rod ends 57
New Monel clippings 28
Clean Monel turnings 21
Old sheet Monel 26
Nickel silver clippings, mixed 16⅛
Nickel silver turnings, mixed. 13⅛

Lead

Soft scrap lead ..... 11½—11⅝
Battery plates (dry) ..... 6½— 6⅝
Batteries, acid free 4½

Magnesium

Segregated solids ..... 18½—19
Castings ..... 17½—18

Miscellaneous

Block tin ..... 70 —75
No. 1 pewter ..... 50 —55
No. 1 auto babbitt 45
Mixed common babbitt ..... 12 —12⅛
Solder joints 17
Siphon tops 45
Small foundry type 16½
Monotype 15
Lino. and stereotype ..... 13½—14
Electrotype ..... 12½—12⅝
Hand picked type shells ..... 9½—10
Lino. and stereo. dross 6⅛
Electro dross 6

IRON AGE

STEEL PRICES

(Effective Apr. 18, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *R7, S10*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					4.30 *P2*		4.30 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$69.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.00 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.90 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4 W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3, S7*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.50 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburgh, Cal.		$87.50 *B2*			4.90 *B2* 4.85 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2C16*		6.15 *T2*			
	Houston, Tex.		$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective Apr. 12, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *10* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Coke* *1.25*-lb. base box	Electro* *0.25* lb. base box	Hollowware Enameling 29 ga
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.30 *B3*			4.675 *W6*	† Special[coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1, R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4, R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1, Y1*	4.95 *I3, U1, Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3, Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.80 *I3, U1, Y1*	$7.30 *I3, U1, Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1, R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1, R3*	7.50 *R3*				$8.80 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1, P6*	4.95 *J3, U1, P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5, F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.										4.925 *S2*			

IRON AGE

STEEL PRICES

(Effective Apr. 12, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							4.225 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.90 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.55 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3*	4.30 *N4,R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I3,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5,C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R3*		5.40 *R5* 5.60 *B5,P8* 5.65 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3 P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3, W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1,Y1, C10,R3*	4.30 *U1,Y1, R3*	5.40 *F2,Y1, C10*	5.075 *U1,Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1,Y1*	4.225 *U1,Y1, R3*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	16.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2¼ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct. Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Apr. 18, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425				
So. Chicago *K1*				7.30			
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.80
Lackawanna *B3*	4.49	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.80		5.425	12.00
Stockton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R3*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom *(W5)*; Brackenridge *(A5)*; Granite City *(G2)*; Indiana Harbor *(I1)*; Mansfield *(E2)*; Newport, Ky. *(N5)*; Niles, O. *(N3)*; Vandergrift *(U1)*; Warren, O. *(R3)*; Zanesville *(A7)*.

* Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*33.60	
Washington, Pa., *J3*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	29.75
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'd ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146		155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149			156	6.90	7.45
Atlanta *A8*	139	151		157	164	7.00	7.525
Bartonville *K2*	139	151		157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	149		155	162	6.90	7.45
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151		157	159	7.00	7.55
Donora, Pa. *A5*	137	149		155	162	6.90	7.45
Duluth *A5*	137	149	150	155	162	6.90	7.45
Fairfield, Ala. *T2*	137	149		155	162	6.90	7.45
Galveston *D4*	139						
Houston *S2*	142	154			164	7.15	7.70
Johnstown, Pa. *B3*	137	149			162	6.90	7.45
Joliet, Ill. *A5*	137	149		155	162	6.90	7.45
Kokomo, Ind. *C9*	139	148		157	161	7.00	7.55
Los Angeles *B2*					7.85		
Kansas City *S2*	142	158		167	164	7.15	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151			163	6.90	7.45
Moline, Ill. *R3*			155				
Pittsburg, Cal. *C7*	156	172		179	182	7.85	8.40
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	149			162	6.90	7.45
So. Chicago *R3*	137	146	150	155	159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139			157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143					7.20	
Williamsport, Pa. *S5*			150				

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. *(A2)*. Galvanized products computed with zinc at 11.0¢ per lb.

WAREHOUSES

Base price, f.o.b. dollars per 100 lb.

City	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.02	7.51	7.64–7.78	6.69	.....	6.37	6.72	6.65	8.02–8.52	12.94	12.54	15.34	15.19
Birmingham	.15	6.35–6.50	7.35–8.10	8.25–9.00	6.60	8.85	6.65	6.65	6.50	8.85	.....	.....	.....	.....
Boston	.10	7.23	8.23–8.78	9.52–9.62	7.47	9.65–9.85	7.34–7.37	7.20–7.49	7.20	8.60–8.70	12.85 13.00	12.60	15.40	15.25
Buffalo	.25	6.35	7.40	8.75–8.80	6.70	7.62	6.65	6.70	6.50	7.40	12.70	12.15–12.40	15.10	14.80–14.95
Chicago	.20	6.35	7.35	8.30	6.62	.....	6.52	6.60	6.51	7.25	12.25	12.05	14.60	14.70
Cincinnati	.20	6.49–6.53	7.37–7.42	8.25–8.30	6.66–6.91	.....	6.81–6.86	6.91	6.75–6.80	7.55	12.55	12.35	14.90	15.00
Cleveland	.20	6.30	7.30	8.25–8.45	6.72	.....	6.60	7.02	6.57	7.35–7.60	11.96	12.11	.....	14.76
Denver		8.15	9.80	10.72	8.40	.....	8.10	8.15	8.30	9.92	.....	.....	.....	17.12
Detroit	.20	6.57	7.57	8.58	6.90	.....	6.80	7.16	6.79	7.54	12.65	12.25	15.05	14.80–14.90
Houston	.20	7.35	7.80	9.93	7.70	.....	7.35	7.60	7.70	9.40–9.50	.....	13.25	.....	.....
Kansas City	.20	7.05	8.05	8.97	7.20	.....	7.19–7.39	7.36	7.18	8.02	.....	12.72	.....	.....
Los Angeles	.10	7.50	9.35	9.95	7.65	.....	7.45	7.65	7.45–7.55	10.15*	.....	13.45	.....	16.60
Memphis	.10	6.79	7.60	.....	6.90	.....	7.01	7.09	6.85	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21–8.30	6.71	.....	6.61	6.86	6.60	7.44	12.34	12.14	14.69	14.79
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90–6.95	7.05	6.80	8.60–10.70	.....	.....	.....	.....
New York	.10	6.97–7.07	7.78–8.56	8.79[1]–8.99	7.36–7.56	10.15	7.07–7.27	7.13–7.38	7.30–7.37	8.63–8.83[2]	12.63	12.43	.....	15.08
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19–6.29	8.09	8.36[4]	7.06	.....	6.59	6.64	6.84	7.86	12.61 12.66	12.36 12.66	15.06	14.91
Pittsburgh	.20	6.30	7.30	8.30–8.50	6.72–6.75	.....	6.52	6.69	6.51	7.35–7.85	12.25	12.05	14.60	14.70
Portland	.20	7.00	7.75	8.90–9.05	7.25	.....	6.85	7.00	7.05	10.20–11.70	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70–8.85	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.35–9.65	7.80	.....	7.40	7.50	7.35	10.05*	.....	13.35	.....	16.50
Seattle	.00	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.80	.....	16.45
St. Louis	.20	6.62–6.67	7.67	8.54–8.58	6.91	8.13	6.61	7.09	6.80	7.64	12.54	12.34	14.84–14.89	14.99
St. Paul	.20	7.04	8.03–8.59	8.96	7.28	.....	7.16	7.35	7.17	8.01	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: ([1]) 1500 to 9999 lb. ([2]) 1000 lb or over. ([4]) $.25 delivery. ([4]) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.30
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.27
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24 in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$12.75 to $13.25
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $17.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	22.00	45	110	10.80
20	72	21.25	40	100, 110	9.50
16 to 18	72	21.50	35	110	9.50
14	72	22.00	30	110	9.60
12	72	22.25	24	72 to 84	9.85
8 to 10	66	22.75	20	90	9.65
7	66	23.00	17	72	9.85
6	60	25.50	14	72	10.25
4	40	28.50	10, 12	60	11.10
3	40	30.00	8	60	11.40
2½	30	36.75			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
⅝ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	*Discount, Case or Keg*
⅝" or smaller	55	64
⅞" to 1⅛" inclusive	53	66
1¼" to 1½" inclusive	60	67½

C.P. Hex. regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

⅝" or smaller	38	50
⅞" to 1⅛" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	27

Cap Screws

	Discount Bright	*H.C. Heat Treated*
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
	Quantity		
¼-in. diam. & under	15,000- 99,999	17	59
	100,000-199,999	25	62
	200,000 & over	33	67
5/16-in. diam. & larger	15,000- 49,999	17	59
	50,000- 99,999	25	62
	100,000 & over	33	67
All diam. over 3 in. long	5,000- 49,999	..	59
	50,000- 99,999	..	62
	100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list		30	33
Bulk, bulk list			
	Quantity		
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite *Bl. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.

Price, net ton; effective CaF_2 content,	
72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	51.50¢
Copper, reduced	51.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	83.00
Lead	23.50¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.16
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Apr. 12, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C .. 36.00	0.15% C ...	33.75
0.025% C, Simplex .. 34.50	0.20% C ..	33.50
	0.50% C ...	33.25
0.06% C ... 34.50	1.00% C ...	33.00
0.10% C ... 34.00	2.00% C ...	32.75

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.65	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.20% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.23

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Boroxil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained 2.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

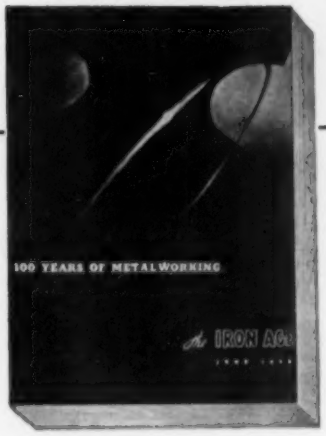
Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcas, contract basis, delivered.

Ton lots	45.00¢



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Watch for "100 Years of Metalworking"—Mid-June, 1955

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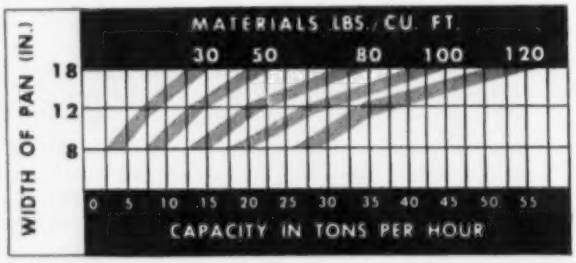

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By cold heading these parts, Harper has been able to save manufacturers over $140,000.00 from what they would cost if they were milled from bar.

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Steel assembly, bottom view. Notice the separate, bolted-on gearbox.
Gray Iron casting, bottom view. The gearbox is cast integrally with ribbing for desired rigidity not obtained on the fabricated assembly.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Chicago Gloom Fades . . . The worries of 30 days ago were vanishing in Chicago last week as spring weather and a spurt of sales among small dealers boosted spirits. Though rebuilders had been seeing a gradual rise since the opening of the year, and though most used tool dealers were reporting advancing net gains as the first quarter of 1955 developed, a number of smaller firms had been hit by a sag in the opening weeks of February. For a few the entire month developed little business.

Beginning as early as 6 weeks ago, and coming along as late as only last week for several, used tool distributors began cutting their inquiry rate and stepping up the volume of actual cash purchases. Throughout first quarter inquiry rate has been high, particularly at the end of January as the 1955 catalogues began bringing in some customer mail. Actual ordering has continued spotty though showing gains almost every successive month.

Rebuilt Demand Rises . . . At the moment, rebuilding is in a very strong position. With the prospect of more military rebuilding orders still to come, ordering of rebuild work by automotive, electronics, and the gear making industries has highlighted an advance in demand for rebuilt machines from just about every segment of industry.

There's no indication at present of a weakening in the incoming order rate on rebuilt equipment. With the advances reported on buying of new capital equipment by manufacturers, a few rebuilders are resetting their sights for a generally higher rate of activity for the remainder of the year.

This is not confined to major firms in the field. Said one small rebuilder last week, "When I came down here a week ago Wednesday I didn't know what we were going to do to keep the place alive. By the beginning of this week I was wondering how we were going to get all the work out." The speaker was more enthusiastic than most, but his attitude is an indication of the general advance in the amount of rebuilding work, exclusive of defense orders, that is coming on to the books. And much of it brand-new.

Others Make Gains . . . In reconditioned and as-is machines there was also a stronger feeling. Most of the veterans had spotted an advance by late January, a continuation of new business that had begun to appear as early as October. But newcomers in the field are now moving up and are now looking harder for equipment.

While general purpose equipment can still be picked up in short order, some material is running low in stock and takes some shopping to replace. Press brakes and shears, for instance, have been getting thinner. Several dealers commented that their stocks have run lower than they had planned, and while it's no pain to fill an order, finding the right machine and price takes longer.

See Position Improved . . . Nobody is sure what the MDNA sales figures for the current quarter will indicate, but most dealers feel they are doing as well as they were a year ago at this time, or even slightly better. They add that a year ago at this time things were still sliding with no sign of a letup. At present, it appears that the volume of business generally will show a further rise in second quarter. Which accounts for some of the present willingness to advance on-the-floor stocks.

The advance now covers welding equipment, and heavy sheet metal equipment as in the past, but has expanded to include more calls for lathes and radials and milling machines.

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2295 cu. ft. ingersoll Rand PRE-2 26½"x15"x19" 150# Pressure, Complete with Elect. Equip., Air Receiver, etc. NEW 1953

ANGLE BENDING ROLL
4 x 4 x ½" Bertsch Angle Bending Roll, M. D.

BENDING ROLLS
8' x ⅝" Webb 9L-2 Initial Type
10' x ⅜" Wickes Pyramid Type
12' x ¼" Hilles & Jones Pyramid Type
13' x ⅜" Niles-Bement-Pond Pyramid Type
16' x ⅜" Bertsch Initial Type Bending Roll
18' x 1⅛" Bertsch Pyramid Type. NEW 1947
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
12' x ⅛" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
Cincinnati All Steel Press Brake 10'x⅜"

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H Trav-Lift	20' Span 220/440 A.C.
3 ton P&H Trav-Lift	28' Span 440 Volt A.C.
5 ton Toledo	60' Span 230 Volt D.C.
7½ ton Shepard-Niles	22' Span 220/3/60 A.C.
10 ton Shepard-Niles	48' Span 230/Volt D.C.
10 ton Harnischfeger	50' Span 220/3/60 A.C.
15 ton OET	45' Span 220/3/60 A.C.
15 ton Case	80' Span 230 Volt D.C.
15 ton P&H With 220/440 AC Generator Set	97' Span 115 Volt D.C.
25 ton P&H With 5 ton Auxiliary	60' Span 230 Volt D.C.
30 ton Whiting	60' Span 230 Volt D.C.
50 ton Niles	60' Span 220/3/60 A.C.
125 ton Cleveland With 2 Trolleys 62½ ton & 10 ton Aux.	65' Span 220 Volt D.C.

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1" 1½" 2½" Acme
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500 ton Wood 4-Columns, 24" Stroke, 72" x 96" Between Columns
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PRESSES—INCLINABLE
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Cleveland, 125 ton, 12" Stroke

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#304 Bliss, 8" Stroke
#308 Bliss, 255 ton, 14" Stroke

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No. 1 Long & Allstatter Double End, Capacity Punch 1⅛" thru 1", Shear 2" Rd., 5x3½" Angles
Style W Cleveland Single End, 60" Throat, 312 Ton With Attachment for Dishing Heads

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8" x 12" Blake & Johnson Single Stand Two High
10" x 14" United Three Stand Two High
12" x 16" Waterbury Farrel Temper Mill
14" x 29" Farrel Birmingham
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16" x 20" Lewis Two High Two Stand
20" x 36" Poole Two Stand Two High
32" x 58" Three High Breakdown Mill

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51" Bertsch, 7 Rolls 10" Diameter
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48" x 1½" Mackintosh-Hemphill
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90" x ½" Birdsboro
11' x 1" Garrison

SHEARS—ANGLE
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No. 2 Taylor Wilson Straightening Sizing & Burnishing Machine, Capacity ¼" to 1⅛" Tubing

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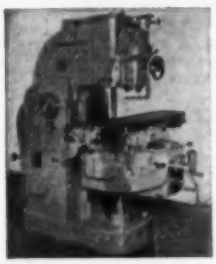

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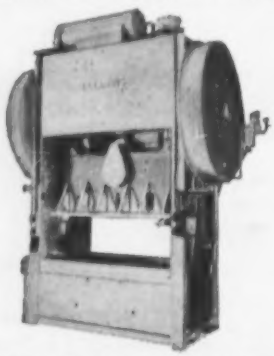

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1	1000	G.E.	MT-455	2200	321
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1	500	Whse.	CW	550	350
1	450	G.E.	IM	440	720
1	400	Whse.	CW-940A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2300/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	565
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150 (unused)	Whse.	CW	2300	435
1	150	G.E.	IM-18	440	600
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2300	435
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1	150	Whse.	CS	440	580
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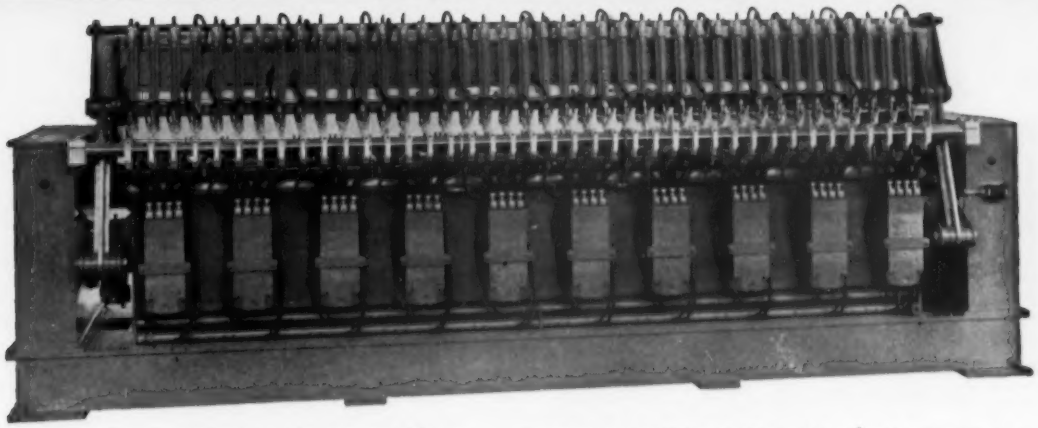

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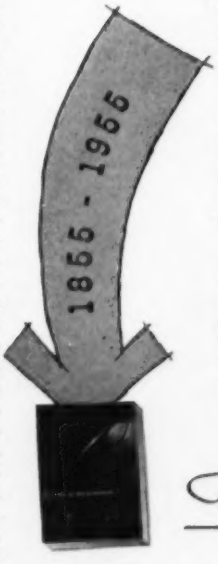

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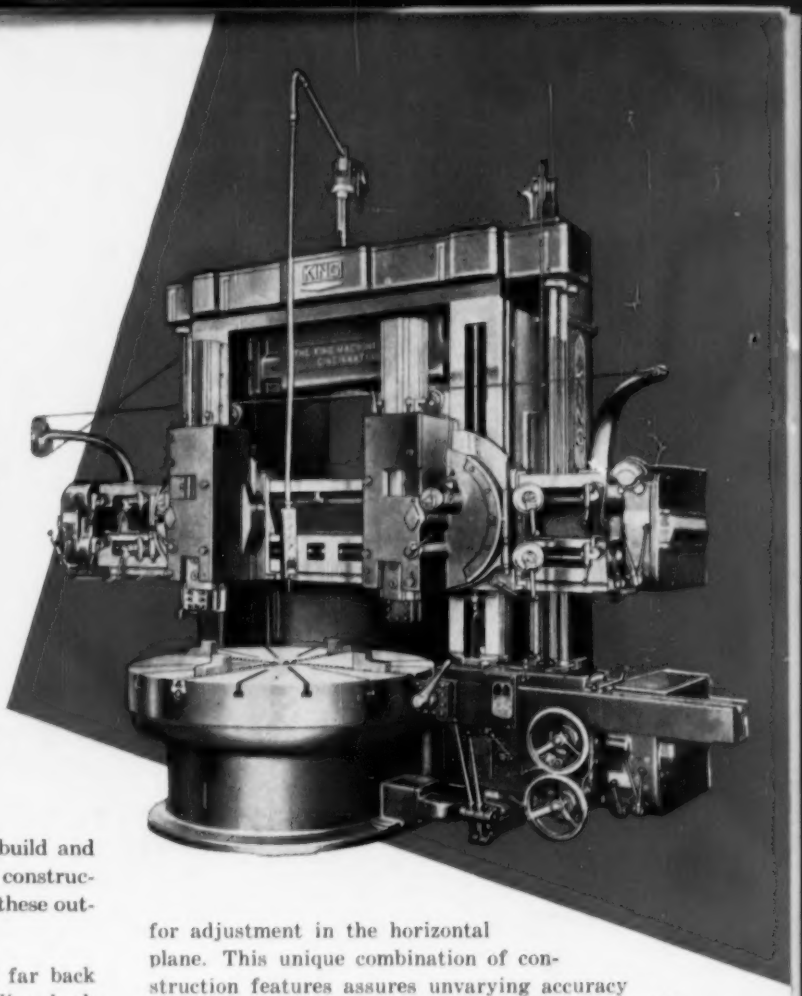

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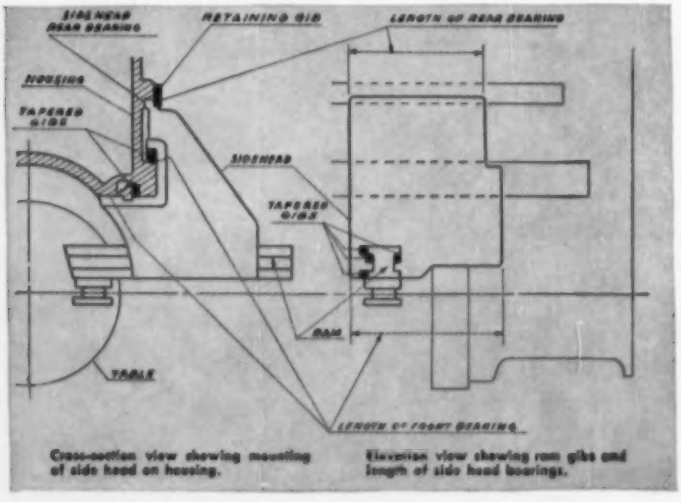

Cross-section view showing mounting of side head on housing.

Elevation view showing ram gibs and length of side head bearings.

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